ALBERTA ECONOMIC MULTIPLIERS

2008

Alberta Treasury Board and Finance

Representations and Warranties

The information contained in this publication is based on the 2008 input-output tables produced by Statistics Canada. All computations were prepared by Alberta Treasury Board and Finance.

Final use and interpretation of the results and validity of inputs is the sole responsibility of the user of the data published in this publication. Any results, either direct or derived, are not a representation of the views or the policies of the Government of Alberta, and must be noted as such in any publication, report or analysis employing this information.

Except as stated herein, Alberta Treasury Board and Finance makes no representations or warranties, expressed or implied, as to merchantability or fitness of these data for any particular purpose.

October, 2012

Preface

This publication presents economic multipliers and supply ratios for the Alberta economy calculated using the 2008 Alberta Treasury Board and Finance Input-Output (I/O) Model. Information is provided for both the Open (direct and indirect impacts) and Closed (direct, indirect and induced impacts) forms of the model. Economic impacts are presented for the Alberta economy only.

The tables used in this publication are derived from the 2008 Interprovincial Input-Output tables released by Statistics Canada in November 2011.

Custom Impact Analysis

In addition to this publication, Alberta Treasury Board and Finance maintains a highly disaggregated I/O model at the worksheet level which covers 300 industries and 727 commodities. The model may be used to simulate directly both open and closed impacts where additional precision or more detailed output is required than is presented in this publication. To make the model more descriptive of changing economic conditions, the industry and commodity structure can also be customized to client specifications.

The I/O model has a tax module that provides impacts on federal, provincial and local tax revenues. The model also includes Full Time Equivalents (FTE's), so running the model gives the number of jobs required as well as FTE's for any given impact.

Inquiries concerning this publication or requests for simulations using the 2008 Alberta Input-Output Model should be directed to:

Catherine Rothrock
Manager, Business Sector Analysis
Economics and Fiscal Policy
Alberta Treasury Board and Finance
555, Terrace Building
9515-107 Street
Edmonton, Alberta
Canada T5K 2C3
Phone: (780) 427-8840
FAX: (780) 426-3951

Table of Contents

Introduction

Measuring Production in the Economy

The most commonly known measure of production in the economy is Gross Domestic Product (GDP). GDP captures the value of goods and services produced for final domestic consumption, export, or investment. In other words, it covers only final, unduplicated output. For example, the value of a good or service sold by Industry A to Industry B, and then used in industry B's production process for sale into final demand, is not directly recorded in GDP. Industry A's output is not counted directly because it is implicitly included in the value of output of industry B when it is sold into final demand. Including Industry's A output would result in double counting of its contribution to the overall economy. To avoid this problem, in calculating GDP, goods or services are valued only at the point where they are sold into final domestic demand (i.e., to households for consumption, to business for investment, or to government for current or capital expenditure), or when they are exported.

In measuring GDP, the value of goods and services consumed during the production process, referred to as intermediate consumption, is not captured. While the GDP method ensures that there is no duplication, very useful information concerning the flow of goods and services among the various industries in an economy is not revealed.

To better reflect these linkages in the economy, it is necessary to use another valuation method called total output. Total output captures the value of goods and services for final consumption or export, plus those that are consumed during the production process, referred to as intermediate inputs. This is the focus of input-output analysis.

The System of National Accounts

Statistics Canada has developed a comprehensive accounting framework, the System of National Accounts (SNA), that provides the tools to analyze production from both a value-added GDP and input-output perspective.

The SNA enables us to measure the value of goods and services in the economy, including the flow of commodities to final demand sectors, the cost of primary inputs to industries, and the value added by industries.

There are four key statistical components of the SNA:

- Input-output (I/O) tables, which summarize the total output of commodities by industry and the use of commodities by industries. They reflect the flow of commodities between industries and to final demand sectors, the value added by industry, and the cost of primary inputs to industries. In this way, the I/O tables describe the activity of production in the economy.
- Income and expenditure accounts, which focus on income generated by productive activity and final expenditure on that production. It is from these tables that the common measure of GDP is calculated. Estimates of Alberta GDP can be found in the income and expenditure accounts of the Alberta Economic Accounts.
- Financial flow and national balance sheet accounts, which focus on capturing transactions in assets and liabilities for a number of institutional sectors. The financial flows accounts reveal the financing of economic activity.
- Balance of payments and international investment position, which are devoted entirely to transactions with non-residents or the rest of the world in the economy.

For more detailed discussion on the SNA, please go to the Statistics Canada website, System of National Economic Accounts www.statcan.gc.ca/nea-cen/index-eng.htm.

The Input-Output Model

What Are I/O Models?

Input-output (I/O) models use the information from I/O tables to capture the interdependence of industries and reflect the flow of goods and services through the economy. The main purpose of I/O models is to do impact analysis, measuring how changes in industry output or final demand for commodities impact the economy in terms of total output, GDP, employment, labour income, and government revenue.

I/O analysis has its foundations in the analytical framework developed by Wassily Leontief in the late 1930s. In its most basic form, an I/O model consists of a system of linear equations which represent how various industries' commodities are distributed throughout the economy.

I/O models are based on tables that describe the flow of commodities through the economy from producers in one industry to another industry, and to final demand. The table below represents a simplified I/O framework:

Table 1: Simplified I/O Accounting Framework

	Industries	Net Final Demand	Total Output
Industries	F	Y	X
Value added (Primary Inputs)	V		
Total Input	X		

Source: UN Handbook of Input-Output Table Compilation and Analysis, 1999

The industries on top are consuming sectors, while the industries down the side are supplying sectors. Matrix F maps out the flow of commodities from the supplying sectors to the consuming sectors, including other industries and to final demand entities. Total input is the sum of the inputs supplied by industries and any value added (other non-industrial inputs to production like labour, profit, depreciation of capital, and indirect taxes). Total output is the sum of output consumed by industries in the production process (represented in row on top), plus net final demand. Theoretically, the total value of output in the economy equals the sum of its inputs (Total Input X = Total Output X).

From this table, fixed-coefficient linear production functions can be developed that represent the proportion of commodities being supplied and consumed by each industry. These coefficients are the backbone of I/O analysis, because they represent how changes in input or output will impact the entire economy.

Table 1 represents a basic I/O model; in practice, I/O models have been developed to incorporate the effects of inter-regional trade flows, employment, taxes, and other variables.

I/O Impacts and Model Closure

The impacts generated through I/O models can be separated into direct, indirect, and induced:

- Direct impacts are those first level impacts resulting from a shock or change in demand, to either industry output or final demand. They refer to the direct impact on those industries that must respond to satisfy the change in demand for commodities.
- Indirect impacts are secondary, and are generated from the linkages between industries. They refer to the impacts on industries that supply intermediate inputs to the industries directly impacted by the shock.
- Induced impacts capture the income effect of the shock. They measure the impact of additional consumption from spending the wages generated by the shock. For example, when there is an increase in final demand, industries have to increase production. They hire additional people, who receive wages. It is assumed that these households, after withdrawing a portion of their income for savings and taxes, spend the rest of their income on consumer goods and services. This creates an additional multiplier effect on the economy.

Calculating GDP

The three methods for calculating GDP can be applied using the I/O framework above.

1) The value-added approach, which is the sum of value added for all industries (subtracting purchases from other businesses from the total value of output)
2) The income approach, which adds up all the factor incomes generated in the production process (for example, labour and profits)
3) The final expenditure approach, which is the sum of all sales to end users, including exports net of imports.

Open vs. Closed

The impact of spending by final demand categories can be considered external to an I/O model because decisions about spending come from factors outside the model, such as availability, personal preference, etc. This means that the final demand by these entities is taken as given, and is unrelated to the level of production by industries in the model. In this type of model, which is referred to as an "Open" I/O model, direct and indirect impacts are measured, while induced are not.

In reality, there is a link between households and the production process through labour and wages, represented by the induced impacts. In this case, the household sector is endogenous to the model and treated as a production sector. The input of the household sector is consumer expenditure on goods and services, while output is labour income (consisting of wages and salaries, supplementary labour income, and net income of unincorporated business). An I/O model which makes households endogenous is referred to as a "Closed" model. I/O models can also be "closed" to other factors such as government sales and purchases, but closure to households is the most common. In this type of model, all three impacts are measured: direct, indirect, and induced.

Closing an I/O model to households increases the interdependence of the system and results in a higher impact on the variables of the model, leading to multipliers of a larger magnitude than those based on the open version. The closed model has been criticized because it introduces a bias in favor of those economic projects with a higher labour content. For example, consider the case where two projects have the identical purchased inputs and the same level of direct GDP, but where one project has a higher proportion of labour income and the other a higher proportion of other operating surplus (e.g., corporate profits). For this case, the closed model will estimate a larger economic impact for the project with the higher proportion of labour income (other things being equal). This result occurs because the model has been "closed" to household spending but not to profits, and the induced impacts estimated by the model are related to the level of household income rather than profits. Care should be exercised when interpreting closed model results.

Limitations of I/O Models

Input-output analysis is based on various assumptions about the economy and the linkages among industries and commodities. While I/O models are a very useful tool in the decision making process, users should be aware of the caveats and limitations when applying them:

- The relationship between industry inputs and outputs is linear and fixed, meaning that a change in demand for a commodity or for the outputs of any industry will result in a proportional change in production. The model cannot account for economies/diseconomies of scale or structural changes in production technologies, an assumption which does not necessarily hold in the real economy.
- Prices are fixed in the model.
- I/O models reflect industry averages for technology use and average input costs. For these and other reasons, an input-output model will not provide a totally complete or absolute measure of the impact of economic change.
- I/O models are static and do not take into account the amount of time required for changes to happen.
- There are no capacity constraints and all industries are operating at capacity. This implies that an increase in output results in an increase in demand for labour (rather than simply re-deploying existing labour). It also implies that there is no displacement that may occur in existing industries as new projects are completed.

The structure and limitations of I/O models lend themselves to measuring the impacts of projects that are shorter term in nature; generally, they are used to look at shocks to the economy. For longer-term, time series analysis, general equilibrium models are more appropriate.

The Input-Output Model

The Alberta I/O Model

Alberta Treasury Board and Finance has developed an I/O model for the Alberta economy based on the structure of Statistics Canada's interprovincial model. Although the Alberta model accounts for the interaction of imports and exports on the Alberta economy (both interprovincial and international), the Alberta model provides impacts only for Alberta. The model has the capacity to run impact analysis on industry expenditures, output, and changes in final demand. The unit of measurement for the Alberta model is dollars, so all calculations are done on a dollar basis.

The key inputs to the model are the Alberta I/O tables, produced annually by Statistics Canada through the SNA. The I/O tables consist of the output, use, and final demand matrices. The output matrix is a table that shows the value of goods and services produced by each industry, the use matrix shows the makeup of the inputs needed for each industry to produce its output, and the final demand matrix shows final consumption of goods and services. Using these tables, it is possible to produce a system similar to the one outlined in Table 1.

I/O tables are available publicly for Canada and the provinces at the "S" Small, "M" Medium, and "L" Link level of aggregation. There is an additional "W" Worksheet level of aggregation, which is provided to provinces confidentially through data-sharing agreements. This level provides the most detail, and includes 300 industries, 727 commodities, and 172 final demand categories. The Alberta I/O model is based on W level data, but analysis can be done at the S, M, and L levels.

The Alberta model has a tax module that provides impacts on federal, provincial, and local tax revenues. The model also includes Full Time Equivalents (FTEs), so running the model estimates the number of jobs required and FTEs for any given impact. There is also the ability to do customized runs for different tax and wage scenarios.

A "safety net" feature was added to the model in 2011. This feature allows for the assumption that a certain number of jobs required for a change in output of a project will come from people who are receiving employment insurance. When this new feature is turned on, the induced impacts resulting from a project will be less, since a portion of new jobs are filled by people previously receiving employment insurance. This means that the amount of additional income earned is lower than if those employees had not been receiving EI benefits. This publication includes both Closed model results without a "Safety Net" and Closed model values with this feature activated.

Results based on the Alberta open model are similar to those provided by the Statistics Canada inter-regional I/O model, since both models are based on Statistics Canada I/O tables, but there are two significant differences between the two models. Firstly, the Statistics Canada model provides inter-provincial impacts, while the Alberta Treasury Board and Finance model provides impacts only for Alberta. Secondly, while both models provide estimates of direct and indirect production, the Alberta Treasury Board and Finance model is "closed" to households, so it also provides estimates of induced economic impacts.

The most common application of I/O models is economic multipliers, which are generated by the I/O model for industries and commodities. Economic multipliers capture the impact of shocks to the economy on output, labour income, employment, and GDP. They enable users to do impact analysis without getting into the detailed analysis associated with the I/O models.

Limitations of I/O Multipliers

Economic mulitpliers are subject to the same caveats and limitations of I/O models. This includes the caveats associated with fixed prices, production technology, and capacity. In addition, there are several other things to keep in mind when using multipliers:

- Multipliers are specific to regions and economies. The multipliers in this publication are for the Alberta economy, and cannot be used to estimate impacts for other regions. This includes other regions within Canada or smaller regions within Alberta.
- The size and interpretation of a multiplier depends on how it is defined. For example, multipliers that include direct, indirect, and induced impacts will be larger than those that just include direct and indirect. There are multipliers that measure the impact on gross output while others measure GDP, or value-added, which is often more desirable because GDP multipliers eliminate the double-counting of expenditures (or benefits). It is important when using multipliers to be clear about the definition of the multiplier and the impacts being measured. It may be tempting to use the multiplier that gives the largest impact, but this may not be the most appropriate multiplier.
- Projects that rely more on locally produced commodities generate higher impacts than those that rely primarily on imports. The greater the linkages between an industry and other parts of the economy, and the greater the value of these linkages, the larger the industry's multiplier.
- Impacts reflect the structure of the economy and industry linkages at a point in time, i.e. 2008. If these linkages have changed, the calculation of the impacts in another year (e.g. 2013) will be less valid. Generally, the more removed the year of analysis from the year of the multipliers, the greater the limitations.
- As discussed previously, I/O models are static and do not give any indication about the time it takes for changes to happen. This means that multipliers do not give any indication about when the impacts will occur or how long they will last. For example, many projects have construction and operating phases, each with its own multiplier effect. Construction impacts may be larger but are short-lived, while operating impacts may be smaller but occur over a longer period.

Alberta Multiplier Structure

Open vs. Closed Multipliers

There are two main kinds of multipliers, open and closed. Open multipliers reflect only direct and indirect effects, and are derived from the open model. Closed multipliers include induced impacts as well as direct and indirect effects, and are derived from the closed model. Results from both the open and closed (to households) models are presented in this publication. This approach allows users to use both versions for the purposes of analysis and to judge for themselves where the inclusion of induced impacts is warranted or advisable.

Industry and Intensity Multipliers

Economic multipliers presented in this report are expressed in two forms: as industry multipliers and as intensity ratios for industries and commodities.

Industry multipliers are calculated by taking the total impact observed for a change in an economic variable and dividing it by the direct change. For example, if adding 100 jobs (the direct change) to an industry's workforce resulted in a total increase of 180 jobs (the total change) in the economy overall, the industry employment multiplier would be 1.8. Users are cautioned that they must know the direct impact on GDP at basic prices, labour income, or number of direct jobs before they can use this type of multiplier.

Intensity ratios for commodities and industries are calculated by dividing the total economic impact by the change in output. For example, if an industry increases its output by $5.0 million and this leads to an increase of $4.0 million in Alberta GDP, the intensity ratio would be 0.80 (4.0/5.0). Intensity ratios are particularly useful for users because they are applied to gross output or expenditure, unlike absolute multipliers, which have to be applied to the direct change. This is the type of multiplier that most users should use since they generally know the direct change in revenue or expenditure, but do not know the direct change in GDP that they are interested in analyzing.

Producer and Purchaser Prices

Commodity intensity ratios are presented in both producer and purchaser prices. Data that are measured in producer prices reflect the price received directly by the producer of the commodity. For example, this corresponds to the "farm gate" price in agriculture or the price received directly by a producing establishment in manufacturing.

Data in purchaser prices reflect the price paid by the final users of the good. This price, in addition to the price received by the producer of the commodity, reflects other costs such as the price of transportation from the producer to the final seller, wholesale and retail mark-ups, and commodity indirect taxes. These other costs, which are added to producer prices to derive purchaser prices, are referred to as margins. The model treats these margins as if they were purchased directly by the purchaser of the final good. For example, if a consumer purchases a television set from a retail outlet in Alberta, the model would treat the transaction as if the consumer had purchased separately the retail and wholesale mark-ups, the transportation costs from the producer to the seller, indirect taxes, and the actual price of the television set received by the producer.

Commodity Supply Ratios

Most commodities that are consumed in Alberta, either as intermediate inputs or through final demand, are not 100 percent produced in Alberta. Often a portion is imported from other parts of Canada or the rest of the world. Table 9, Alberta Commodity Supply Ratios, summarizes the proportion of the supply that comes from within and outside Alberta for each major commodity group. For example, according to the table, 66.8 percent of forestry products are produced in Alberta, while 29.4 percent come from the rest of Canada and 3.8 percent come from the rest of the world.

The multipliers presented in this publication reflect the impact of output only produced in Alberta. This means that in the case where a commodity is purchased, the total value of the purchase must be adjusted to reflect the value of output from Alberta before the multplier is applied. An example is outlined below for a $1,000,000 increase in the demand for Grains:

- 73.8 percent of Grains come from Alberta.
  Total value = $1,000,000 * 73.8% = $738,000
- The GDP impact = $738,000 * 0.793 = $585,234

Application of the Alberta Multipliers

Due to the limitations of the I/O model, it is unlikely that many of the assumptions and caveats associated with the multipliers would hold fully in the real world. It is important to understand the limitations and apply the multipliers in a reasonable way.

The most common application of multipliers is to estimate the economic impact associated with the establishment of a new firm or the expansion, contraction or closure of existing firms. In these cases, it is preferable to use economic multipliers for relative, rather than absolute, comparisons. This means that while economic multiplier analysis may be used to determine which activity has the largest economic impact, it should not be used to estimate the absolute impact of any single activity. Where multipliers are used to estimate the impacts of a single activity, the results should be treated as general estimates only and not as absolute values.

When using the employment multipliers, users are cautioned that these multipliers show the total number of jobs that are required to support the change in activity being considered, but does not indicate the number of new jobs created. When the economy is running at full employment, it is important to remember that the number of jobs required for a particular project must come from other projects/industries or from outside the province. As indicated above, the I/O model assumes unlimited capacity, whereas in reality, there is a limited number of people in the workforce. Please note that all employment impacts referenced throughout this document are measured in person-years.

The industry multipliers in this publication are at the "medium" level of aggregation, while the commodity multipliers are provided at the "small" level. For more detailed impact analysis that considers specific industries or commodities at a more granular level, it may be necessary to do a custom run through Alberta Treasury Board and Finance.

Some of the limitations may be overcome by using an updated industry input structure based on more current data, and subjecting this revised information to a computer simulation using the input-output model developed by Alberta Treasury Board and Finance. If users wish to exercise this option, they should contact Alberta Treasury Board and Finance directly.

Description of Economic Multiplier Tables

In this publication, economic multipliers are presented for GDP at basic prices, labour income, employment and gross production. Below is a brief description of each of the tables contained in this report and how they should be used. Tables 1 to 4 present results from the open model, while Tables 5 to 8 present results from the closed model. Table 9 presents commodity supply ratios for Alberta.

Table 1: **Industry Intensity Ratios**

Open Model

Table 1 presents industry intensity ratios that measure the direct and indirect effects on the Alberta economy due to a change in output for each of the 59 major industries. The multipliers measure the effects on the Alberta economy in terms of GDP at basic prices, labour income, employment and gross production.

The impacts on GDP, labour income and gross production are expressed as impacts per dollar of output change while employment impacts are expressed as the number of jobs per $10,000 of output (both in 2007 and 2010 dollars).

Example:

If there was a $1 million increase in the output of the construction industry (industry no. 230) in 2011, the economic impacts would be as follows:

- The impact on GDP at basic prices
  0.681 * $1,000,000 = $681,000.
- The impact on labour income
  0.506 * $1,000,000 = $506,000.
- Employment required for the increase in output
  $1,000,000/$10,000 * 0.063 = 6.3 jobs
  (based on the second column of employment intensity ratios).
- The impact on gross production
  1.601 * $1,000,000 = $1,601,000.

Table 2: **Industry Multipliers**

Open Model

Table 2 consists of multipliers (direct and indirect) for industries. To use these multipliers, the user must know the direct increase in GDP at basic prices, labour income, and the direct number of jobs for which the economic impacts are being analyzed.

- To use the GDP multiplier, the direct GDP content associated with some change in output must be known or calculated. The components of direct GDP are those items which make up a firm's operating surplus (wages, profits, depreciation, etc.). The GDP multiplier is applied to this value.
- To use the labour income multiplier, the direct increase in wages, supplementary labour income and net income of unincorporated business must be known or estimated. The labour income multiplier is then applied to this value.
- The employment multiplier is expressed in terms of total number of jobs per direct job. For example, if a firm in construction (industry no. 230) was established and in 2010 employed 100 people directly, a total of 100 * 1.720 = 172.0 jobs would be required (i.e., 100 direct jobs plus an additional 72.0 indirect jobs). Please note that the model cannot distinguish between employee and self-employed jobs.
- The gross production multiplier is expressed in terms of total gross production per dollar of direct production. For this multiplier, the direct production equals the total expenditure or output of the project.

Table 3: **Commodity Intensity Ratios - Producer Prices**

Open Model

Table 3 presents multipliers for the direct and indirect effects on the Alberta economy due to a change in output for each of the 43 commodities.

The impacts on GDP and labour income are expressed as impacts per dollar of output change, while employment impacts are expressed as the number of jobs per $10,000 of output (both in 2008 and 2010 dollars). Table 3 presents results calculated for data in producer prices.

Example:

If output of Non-Metallic Mineral Products (commodity 25) increased by $10 million during 2011 in Alberta, the economic impacts would be as follows:

- The impact on GDP at basic prices
  0.844 * $10,000,000 = $8,440,000.
- The impact on labour income
  0.417 * $10,000,000 = $4,170,000.
- Employment required for the increase in demand
  $10,000,000/$10,000 * 0.059 = 59.0 jobs
  (based on 2010 dollars).

Description of Economic Multiplier Tables

Table 4: **Commodity Intensity Ratios - Purchaser Prices**

Open Model

Table 4 is analogous to Table 3 except that it presents results for data in purchaser prices.

Table 5: **Industry Intensity Ratios**

Closed Model

Table 5 is analogous to Table 1, except that it presents results for the closed model, which includes induced impacts in addition to the direct and indirect effects.

Table 6: **Industry Multipliers**

Closed Model

Table 6 is analogous to Table 2 except that it presents results for the closed model, which includes induced impacts in addition to the direct and indirect effects.

Table 7: **Commodity Intensity Ratios at Producer Prices**

Closed Model

Table 7 is analogous to Table 3, except that it presents results for the closed model, which includes induced impacts in addition to the direct and indirect effects.

Table 8: **Commodity Intensity Ratios at Purchaser Prices**

Closed Model

Table 8 is analogous to Table 4, except that it presents results for the closed model, which includes induced impacts in addition to the direct and indirect effects.

Table 9: **Commodity Supply Ratios**

Percent

Table 9 shows the source of supply for commodities purchased in Alberta. The data is presented as a percent for Alberta, the rest of Canada, and the rest of world. This table indicates both the extent of "openness" of the Alberta economy and the degree to which the economy depends on imports. For example, 66.8 percent of forestry products (commodity 3) purchased in Alberta were supplied by Alberta domestic production, 29.4 percent were imported from the rest of Canada, and 3.8 percent were imported from outside Canada.

Table 10: **Industry Intensity Ratios**

Closed Model with Safety Net

Table 10 is analogous to Table 5, except that the results are presented with a "safety net" activated.

Table 11: **Industry Multipliers**

Closed Model with Safety Net

Table 11 is analogous to Table 6, except that the results are presented with a "safety net" activated.

Table 12: **Commodity Intensity Ratios at Producer Prices**

Closed Model with Safety Net

Table 12 is analogous to Table 7, except that the results are presented with a "safety net" activated.

Table 13: **Commodity Intensity Ratios at Purchaser Prices**

Closed Model with Safety Net

Table 13 is analogous to Table 8, except that the results are presented with a "safety net" activated.

Application of Economic Multipliers

The following example shows how multipliers and intensity ratios are used. In this example, the goal is to analyze which of two projects will provide a greater economic impact on the Alberta economy.

In general, the information available to do the analysis will determine which multiplier is most appropriate to use. For the purposes of this example, the results are presented for the open model only. The same calculations can be done using the appropriate closed model tables.

The following information is available:

Project 1:

Construction of an establishment in the Wood Manufacturing Industry

The plant (establishment) will cost $4 million to build in 2012. A further $1 million will be spent purchasing machinery. When in operation in 2013, the plant will provide 12 jobs and generate annual sales of $3 million with the distribution of costs outlined below. All data are in producer prices. For simplicity, net taxes on production and products are ignored.

	($000s)
Wages	$ 600
Profits	$ 425
Depreciation	$ 340
Overhead	$ 35
Materials	$ 1,600
Total Output (Sales)	$ 3,000

Project 2:

Expansion of output by an establishment in the Wholesale Trade Industry

This project expands production by $3 million (in producer prices) in 2012 and 2013.

Analysis of Project 1

To analyze the impact of Project 1, it is necessary to divide the project into two phases. The first phase occurs in 2012 and involves the effects of constructing the plant and purchasing the machinery. The second phase is the economic impacts of the yearly output of the plant beginning in 2013.

Construction Phase of Project 1:

Project 1 involves the construction of a plant to manufacture wood products, so the appropriate intensity ratios are those found in Table 3, Alberta Commodity Intensity Ratios in Producer Prices, commodity 30 (non-residential construction). The commodity table is used because the activity would be completed in Alberta by contractors whose output (or commodity) is construction. Since a commodity is being purchased, Table 9 must be applied to account for the proportion of output coming from Alberta. In the case of non-residential construction, the proportion of supply from Alberta is 100 percent.

The construction phase during 2012 would have the following effects:

- The impact on GDP at basic prices
  0.694 * $4,000,000 = $2,775,000.
- The impact on labour income
  0.516 * $4,000,000 = $2,064,000.
- Employment required
  $4,000,000/$10,000 * 0.062 = 24.8 jobs
  (based on the column scaled in 2010 dollars).

The effects of price increases should be accounted for when determining employment impacts beyond 2010. For example, if prices for non-residential construction (or some other suitable proxy for inflation) increased by 3 percent from 2010 to 2012, the industry employment intensity ratio would be adjusted as follows:

- Estimated employment multiplier for 2012
  0.062/1.03 = 0.060.

Using this revised employment multiplier, growth in employment for 2012 would be estimated at $4,000,000/$10,000 * 0.060 = 24.0 jobs.

The impacts of purchasing the machinery in 2012 are also estimated by using intensity ratios from Table 3, specifically the ratios for commodity 22, machinery. According to Table 9, 25.3 percent of the machinery used in Alberta is produced in the province, so the value of the machinery purchased must be adjusted to reflect this.

The calculated impacts due to machinery purchases are as follows:

- Total value of Alberta machinery = 25.3% * $1,000,000 = $253,000.
- The impact on GDP at basic prices
  0.774 * $253,000 = $195,822.

- The impact on labour income
  0.397 * $253,000 = $100,441.
- Employment required
  0.048/1.03 = 0.047
  $253,000/$10,000 * 0.047 = 1.2 jobs.

Alberta clearly derives more economic benefit from the construction activity associated with Project 1 than it does from the purchase of machinery. This is partly due to the higher Alberta content for construction (i.e., local labour and materials) compared with machinery, which is predominately produced outside the province.

Operations Phase of Project 1:

The second phase of impacts associated with Project 1 involves the actual operation of the plant, which would begin operations in 2013. For this phase, the industry tables are used, since the impacts associated with the output of a particular industry are being analyzed. Since both the value of direct output and a breakdown of inputs has been given, either industry intensity ratios (Table 1) or industry multipliers (Table 2) can be used. To use Table 1, the procedure is to locate the appropriate industry and apply the ratios to the value of output. Here, information for industry no. 321 (wood product industries) is used yielding the following impacts:

- The impact on GDP at basic prices
  0.691 * $3,000,000 = $2,073,000.
- The impact on labour income
  0.430 * $3,000,000 = $1,290,000.
- Employment required
  $3,000,000/$10,000 * 0.059 = 17.7 jobs
  (based the 2010 industry employment intensity ratio).
- Estimated employment multiplier for 2013
  (assuming a 5 percent price increase)
  0.059/1.05 = 0.056.

Using this revised employment multiplier, growth in employment for 2013 would be estimated at $3,000,000/$10,000 * 0.056 = 16.9 jobs.

Since detailed cost information has been provided, the industry multipliers provided in Table 2 can also be used. The first step is to analyze the categories for which cost information has been provided and identify which of these enter into the establishment's operating surplus and thereby directly into GDP at basic prices. As a rule, wages, profits and depreciation are primary inputs (not purchased from another industry) and go directly into GDP. If overhead consists of salaries for administration (as is assumed in this case), this category also enters directly into GDP. Materials and other purchased inputs do not since they are purchased from other industries and involve indirect economic impacts.

Therefore, the cost categories can be allocated as follows:

	(000s)	
Wages	$ 600	Direct GDP
Profit	$ 420	Direct GDP
Depreciation	$ 340	Direct GDP
Overhead	$ 35	Direct GDP
Subtotal	$ 1,400	Direct GDP
Materials	$ 1,600	Indirect Output
Total	$ 3,000	

Thus, $1,400,000 out of the firm's $3 million gross output constitutes its direct contribution to GDP at basic prices.

Included in this contribution is an estimated $635,000 ($600,000 + $35,000) of direct labour income and 12 direct jobs to which the appropriate multipliers from Table 2 (industry no. 321, wood product manufacturing) would be applied. The impacts are below, based on Table 2:

- The impact on GDP at basic prices
  1.732 * $1,400,000 = $2,424,800.
- The impact on labour income
  1.686 * $635,000 = $1,070,610.
- Employment required
  1.756/1.05 = 1.672
  1.672 * 12.0 direct jobs = 20.1 jobs.

In this example, the results using multipliers from Table 2 are similar to those calculated using the intensity ratios from Table 1. In practice, the multipliers from Table 2 should be used in preference to the intensity ratios from Table 1. Intensity ratios assume an "average" direct contribution to labour income, GDP at basic prices, and employment, and these factors can vary substantially from industry averages for particular firms. Generally, a more accurate result can be obtained by using actual data for firms and industry multipliers rather than the industry averages implied in the intensity ratios. However, to use Table 2, one must already know the direct impacts on GDP.

Analysis of Project 2

The only information provided for Project 2 is that output will increase by $3 million in both 2012 and 2013 for an establishment in the wholesale trade industry. Since only industry data on output has been provided, one of the industry tables must be used (Table 1 or 2). As there is no breakdown of costs provided, direct GDP associated with the change in output cannot be calculated. In this case, industry intensity ratios from Table 1, rather than the multipliers from Table 2, must be used.

In Table 1, the wholesale trade industry is number 410. The $3 million change in the value of output is applied to each intensity ratio yielding the following total impacts:

- Impact to GDP at basic prices
  0.821 * $3,000,000 = $2,463,000
- Impact on labour income
  0.547 * $3,000,000 = $1,641,000
- $3,000,000/$10,000 * 0.079 = 23.7 jobs required (based on the column scaled in 2010 dollars).

Since the change in output of $3 million is the same for 2012 and 2013, the labour income and GDP impacts would be the same for both years.

To calculate the 2012 and 2013 employment impact, it is necessary to allow for price increases over 2010. For example, if the industry selling price (or another appropriate price proxy) for the wholesale trade industry increased by 3 percent in 2012, the employment multiplier (scaled in 2010 dollars) is adjusted as follows:

- 0.079/1.03 = 0.077.

Therefore, the employment impact in 2012 would be:

- $3,000,000/$10,000 * 0.077 = 23.0 jobs.

For 2013, the employment multiplier is adjusted as follows (assuming a 5 percent price increase):

- 0.079/1.05=0.075

Therefore, the employment impact in 2013 would be:

- $3,000,000/$10,000 * 0.075 = 22.6 jobs.

Comparison of the Two Projects

The last step in the analysis is to compare the results of the two projects. The following is a summary of the results (note that for Project 1, we have to add the impacts of the construction and machinery purchases to get total impact for 2012):

	Project 1	Project 2
GDP at Basic prices ($000s):		
2012	2,971	2,463
2013	2,425	2,463
Labour Income ($000s):		
2012	2,164	1,641
2013	1,071	1,641
Employment (Jobs):		
2012	25.2	23.0
2013	20.1	22.6

It is clear that Project 1 has the larger economic impact for 2012. This result is largely due to the construction phase of the plant. If a longer term view is taken, then Project 2 may in fact yield the larger economic benefit. This can be seen by comparing impacts for 2013, for which Project 2 has a greater effect on GDP, labour income and employment.

It must be remembered that when the economy is in a phase of full employment, an increase in resources in one project may draw resources from other industries, reducing the overall impact. Furthermore, the multipliers used in the above examples reflect the structure of the economy and industry linkages in 2008. If these linkages were to have changed materially by 2012 or 2013, the impacts calculated above will be less valid.

Tables

Table 1: Alberta Industry Intensity Ratios

Open Model - Direct and Indirect Impacts

Industry		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
11A	Crop and animal production	0.746	0.265	0.065	0.063	1.902
113	Forestry and logging	0.722	0.418	0.055	0.056	1.880
114	Fishing, hunting and trapping	0.767	0.845	0.205	0.199	1.597
115	Support activities for agriculture and forestry	0.741	0.513	0.098	0.097	1.649
211	Oil and gas extraction	0.909	0.165	0.016	0.016	1.293
212	Mining (except oil and gas extraction)	0.846	0.247	0.027	0.026	1.354
213	Support activities for mining and oil and gas extraction	0.806	0.595	0.067	0.067	1.409
22A	Electric power generation, transmission and distribution	0.828	0.243	0.023	0.022	1.297
22B	Natural gas distribution, water, sewage and other systems	0.907	0.277	0.033	0.032	1.480
230	Construction	0.681	0.506	0.065	0.063	1.601
311	Food manufacturing	0.572	0.297	0.063	0.064	2.105
312	Beverage and tobacco product manufacturing	0.602	0.273	0.041	0.042	1.515
31A	Textile and textile product mills	0.604	0.420	0.106	0.103	1.308
315	Clothing manufacturing	0.636	0.516	0.190	0.185	1.284
316	Leather and allied product manufacturing	0.699	0.339	0.180	0.186	1.435
321	Wood product manufacturing	0.691	0.430	0.060	0.059	1.718
322	Paper manufacturing	0.570	0.300	0.034	0.033	1.543
323	Printing and related support activities	0.653	0.397	0.065	0.061	1.329
324	Petroleum and coal products manufacturing	0.828	0.180	0.018	0.018	2.129
325	Chemical manufacturing	0.664	0.230	0.028	0.028	2.022
326	Plastics and rubber products manufacturing	0.584	0.378	0.058	0.057	1.598
327	Non-metallic mineral product manufacturing	0.742	0.367	0.049	0.052	1.626
331	Primary metal manufacturing	0.386	0.190	0.025	0.025	1.300
332	Fabricated metal products manufacturing	0.574	0.428	0.057	0.059	1.367
333	Machinery manufacturing	0.533	0.334	0.040	0.041	1.302
334	Computer and electronic product manufacturing	0.540	0.357	0.046	0.047	1.345
335	Electrical equipment, appliance and component manufacturing	0.499	0.446	0.056	0.058	1.327
336	Transportation equipment manufacturing	0.545	0.403	0.060	0.059	1.286
337	Furniture and related product manufacturing	0.601	0.477	0.090	0.087	1.456
339	Miscellaneous manufacturing	0.670	0.460	0.082	0.085	1.382
410	Wholesale trade	0.821	0.547	0.081	0.079	1.545
4A0	Retail trade	0.855	0.624	0.148	0.141	1.496
484	Truck transportation	0.804	0.598	0.080	0.083	1.533

Table 1

Industry		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
485	Transit and ground passenger transportation	0.987	0.687	0.150	0.144	1.622
486	Pipeline transportation	0.927	0.221	0.022	0.022	1.231
48A	Other transportation	0.738	0.430	0.060	0.059	1.650
49A	Postal service and couriers and messengers	0.835	0.633	0.137	0.134	1.575
493	Warehousing and storage	0.907	0.757	0.147	0.142	1.247
512	Motion picture and sound recording industries	0.641	0.301	0.114	0.111	1.547
513	Broadcasting and telecommunications	0.849	0.296	0.042	0.038	1.303
51A	Publishing industries, information services and data processing services	0.835	0.472	0.073	0.071	1.316
5A0	Finance, insurance, real estate and rental and leasing	0.991	0.548	0.044	0.044	1.418
541	Professional, scientific and technical services	0.826	0.637	0.094	0.091	1.469
561	Administrative and support services	0.813	0.664	0.195	0.190	1.494
562	Waste management and remediation services	0.893	0.675	0.113	0.114	1.346
610	Educational services	0.953	0.772	0.256	0.250	1.208
620	Health care and social assistance	0.872	0.626	0.105	0.100	1.314
710	Arts, entertainment and recreation	0.792	0.630	0.192	0.192	1.548
720	Accommodation and food services	0.725	0.503	0.161	0.155	1.488
811	Repair and maintenance	0.853	0.663	0.119	0.110	1.485
813	Grant-making, civic, and professional and similar organizations	0.851	0.716	0.149	0.140	1.477
81A	Personal and laundry services and private households	0.671	0.441	0.223	0.226	1.282
NP1	Non-profit institutions serving households (excluding education)	0.855	0.734	0.173	0.172	1.426
NP2	Non-profit education services	0.864	0.778	0.135	0.138	1.282
GS1	Hospitals and government nursing and residential care facilities	0.814	0.696	0.117	0.108	1.333
GS2	Universities and government education services	0.915	0.793	0.119	0.117	1.266
GS4	Other municipal government services	0.880	0.588	0.083	0.080	1.379
GS5	Other provincial and territorial government services	0.815	0.615	0.094	0.089	1.756
GS6	Other federal government services	0.807	0.667	0.086	0.082	1.419

Notes: Intensity ratios for GDP, Labour Income and Gross Output expressed as total impact per dollar of output change. Intensity ratios for employment expressed as total number of jobs required per $10,000 of output change. Please note that all employment impacts are measured in person-years.

Table 2: Alberta Industry Multipliers

Open Model - Direct and Indirect Impacts

Industry		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
11A	Crop and animal production	2.033	2.803	1.857	1.864	1.902
113	Forestry and logging	1.656	1.673	1.803	1.780	1.880
114	Fishing, hunting and trapping	1.311	1.172	1.098	1.098	1.597
115	Support activities for agriculture and forestry	1.544	1.381	1.289	1.284	1.649
211	Oil and gas extraction	1.205	2.083	3.055	3.166	1.293
212	Mining (except oil and gas extraction)	1.240	1.541	1.833	1.865	1.354
213	Support activities for mining and oil and gas extraction	1.252	1.173	1.249	1.245	1.409
22A	Electric power generation, transmission and distribution	1.256	1.366	1.583	1.592	1.297
22B	Natural gas distribution, water, sewage and other systems	1.409	1.773	1.920	1.945	1.480
230	Construction	1.745	1.613	1.682	1.720	1.601
311	Food manufacturing	2.799	2.545	3.004	2.829	2.105
312	Beverage and tobacco product manufacturing	X	X	X	X	1.515
31A	Textile and textile product mills	1.282	1.226	1.137	1.138	1.308
315	Clothing manufacturing	X	X	X	X	1.284
316	Leather and allied product manufacturing	X	X	X	X	1.435
321	Wood product manufacturing	1.732	1.686	1.740	1.756	1.718
322	Paper manufacturing	1.657	1.736	2.101	2.160	1.543
323	Printing and related support activities	1.282	1.276	1.253	1.268	1.329
324	Petroleum and coal products manufacturing	12.597	6.633	10.033	9.989	2.129
325	Chemical manufacturing	3.649	3.212	3.723	3.740	2.022
326	Plastics and rubber products manufacturing	1.574	1.405	1.368	1.371	1.598
327	Non-metallic mineral product manufacturing	1.716	1.609	1.672	1.609	1.626
331	Primary metal manufacturing	X	X	X	X	1.300
332	Fabricated metal products manufacturing	1.394	1.314	1.367	1.350	1.367
333	Machinery manufacturing	1.334	1.319	1.414	1.397	1.302
334	Computer and electronic product manufacturing	1.413	1.405	1.522	1.504	1.345
335	Electrical equipment, appliance and component manufacturing	1.433	1.291	1.381	1.357	1.327
336	Transportation equipment manufacturing	X	X	X	X	1.286
337	Furniture and related product manufacturing	1.482	1.347	1.287	1.288	1.456
339	Miscellaneous manufacturing	1.337	1.289	1.248	1.237	1.382
410	Wholesale trade	1.447	1.382	1.453	1.455	1.545
4A0	Retail trade	1.362	1.273	1.178	1.184	1.496
484	Truck transportation	1.468	1.315	1.350	1.333	1.533

Table 2

Industry		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
485	Transit and ground passenger transportation	X	X	X	X	1.622
486	Pipeline transportation	1.157	1.474	1.773	1.777	1.231
48A	Other transportation	1.661	1.516	1.591	1.591	1.650
49A	Postal service and couriers and messengers	1.485	1.360	1.268	1.268	1.575
493	Warehousing and storage	X	X	X	X	1.247
512	Motion picture and sound recording industries	X	X	X	X	1.547
513	Broadcasting and telecommunications	X	X	X	X	1.303
51A	Publishing industries, information services and data processing services	X	X	X	X	1.316
5A0	Finance, insurance, real estate and rental and leasing	1.460	1.766	1.856	1.824	1.418
541	Professional, scientific and technical services	1.330	1.262	1.301	1.301	1.469
561	Administrative and support services	1.312	1.196	1.103	1.101	1.494
562	Waste management and remediation services	1.220	1.168	1.168	1.161	1.346
610	Educational services	1.131	1.080	1.039	1.039	1.208
620	Health care and social assistance	1.182	1.139	1.140	1.144	1.314
710	Arts, entertainment and recreation	1.344	1.257	1.154	1.150	1.548
720	Accommodation and food services	1.409	1.321	1.156	1.160	1.488
811	Repair and maintenance	1.346	1.244	1.231	1.245	1.485
813	Grant-making, civic, and professional and similar organizations	1.284	1.194	1.163	1.168	1.477
81A	Personal and laundry services and private households	0.897	0.772	1.060	1.057	1.282
NP1	Non-profit institutions serving households (excluding education)	1.285	1.160	1.111	1.108	1.426
NP2	Non-profit education services	1.134	1.070	1.067	1.063	1.282
GS1	Hospitals and government nursing and residential care facilities	1.186	1.138	1.148	1.157	1.333
GS2	Universities and government education services	1.156	1.106	1.136	1.133	1.266
GS4	Other municipal government services	1.266	1.231	1.280	1.288	1.379
GS5	Other provincial and territorial government services	2.208	2.154	2.544	2.584	1.756
GS6	Other federal government services	1.328	1.244	1.346	1.355	1.419

Notes: Multipliers for GDP expressed as total impact per direct change in GDP.
Multipliers for Labour Income expressed as total impact per direct change in Labour Income.
Multipliers for Gross Output expressed as total impact per direct change in Gross Output.
Multipliers for Employment expressed as total jobs required per direct job required.
Please note that all employment impacts are measured in person-years.

You must know the direct change in GDP at basic prices, labour income or number of direct jobs required before using these multipliers.

Table 3: Alberta Commodity Intensity Ratios in Producer Prices

Open Model - Direct and Indirect Impacts

Commodity		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
1	Grains	0.793	0.201	0.038	0.037	1.602
2	Other agricultural products	0.733	0.311	0.077	0.075	1.979
3	Forestry products	0.724	0.415	0.055	0.056	1.870
4	Fish and seafood and hunting and trapping products	0.752	0.419	0.087	0.085	1.451
5	Metal ores and concentrates	0.788	0.271	0.039	0.038	1.505
6	Mineral fuels	0.908	0.165	0.017	0.016	1.293
7	Non-metallic minerals	0.878	0.205	0.023	0.022	1.356
8	Services incidental to mining	0.806	0.592	0.067	0.067	1.410
9	Meat, fish and dairy products	0.542	0.315	0.075	0.075	2.306
10	Fruit, vegetable and other food products and feeds	0.624	0.281	0.047	0.048	1.655
11	Soft drinks and alcoholic beverages	0.678	0.401	0.110	0.108	1.514
12	Tobacco and tobacco products	0.000	0.000	0.000	0.000	0.000
13	Leather, rubber, and plastic products	0.589	0.375	0.058	0.057	1.610
14	Textile products	0.611	0.430	0.143	0.139	1.296
15	Hosiery, clothing and accessories	0.630	0.513	0.153	0.150	1.343
16	Lumber and wood products	0.691	0.436	0.064	0.063	1.697
17	Furniture, mattresses and lamps	0.590	0.493	0.087	0.085	1.471
18	Wood pulp, paper and paper products	0.599	0.306	0.036	0.035	1.574
19	Printing and publishing	0.744	0.392	0.065	0.062	1.336
20	Primary metal products	0.415	0.243	0.031	0.031	1.333
21	Fabricated metal products	0.573	0.413	0.056	0.058	1.360
22	Machinery	0.609	0.313	0.037	0.038	1.309
23	Motor vehicles, other transportation equipment and parts	0.590	0.418	0.062	0.060	1.346
24	Electrical, electronic and communication products	0.490	0.393	0.051	0.052	1.348
25	Non-metallic mineral products	0.741	0.367	0.049	0.052	1.622
26	Petroleum and coal products	0.858	0.175	0.018	0.017	1.814
27	Chemicals, pharmaceuticals and chemical products	0.668	0.231	0.030	0.029	2.032
28	Miscellaneous manufactured products	0.663	0.410	0.064	0.065	1.425
29	Residential building construction	0.625	0.466	0.065	0.063	1.494

Table 3

Commodity		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
30	Non-residential construction	0.694	0.516	0.065	0.062	1.643
31	Repair construction	0.684	0.521	0.070	0.069	1.442
32	Transportation and storage	0.819	0.482	0.071	0.071	1.516
33	Communications services	0.845	0.358	0.059	0.056	1.352
34	Other utilities	0.857	0.303	0.036	0.035	1.361
35	Wholesaling margins	0.813	0.540	0.080	0.078	1.546
36	Retailing margins and services	0.852	0.620	0.145	0.137	1.493
38	Finance, insurance, and real estate services	0.840	0.480	0.065	0.064	1.559
39	Professional, scientific, technical, computer, administrative, support, and related services	0.834	0.605	0.093	0.090	1.452
40	Education tuition and other fees	0.898	0.748	0.149	0.146	1.307
41	Health care and social assistance services	0.878	0.674	0.119	0.113	1.307
42	Accommodation services and meals	0.723	0.502	0.161	0.156	1.501
43	Miscellaneous services	0.791	0.539	0.129	0.127	1.501
47	Non-market services provided by non-profit institutions serving households	0.859	0.739	0.176	0.175	1.407
48	Non-market government sector services	0.846	0.674	0.102	0.097	1.478

Notes: Intensity ratios for GDP, Labour Income and Gross Output expressed as total impact per dollar of output change. Intensity ratios for employment expressed as total number of jobs required per $10,000 of output change. Please note that all employment impacts are measured in person-years.

Table 4: Alberta Commodity Intensity Ratios in Purchaser Prices

Open Model - Direct and Indirect Impacts

Commodity		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
1	Grains	0.793	0.201	0.038	0.037	1.602
2	Other agricultural products	0.699	0.297	0.074	0.072	1.888
3	Forestry products	0.718	0.411	0.054	0.055	1.854
4	Fish and seafood and hunting and trapping products	0.558	0.311	0.065	0.063	1.077
5	Metal ores and concentrates	0.788	0.271	0.039	0.038	1.505
6	Mineral fuels	0.771	0.140	0.014	0.013	1.098
7	Non-metallic minerals	0.725	0.169	0.019	0.018	1.120
8	Services incidental to mining	0.806	0.592	0.067	0.067	1.410
9	Meat, fish and dairy products	0.392	0.228	0.054	0.054	1.667
10	Fruit, vegetable and other food products and feeds	0.460	0.207	0.035	0.035	1.220
11	Soft drinks and alcoholic beverages	0.560	0.331	0.091	0.089	1.250
12	Tobacco and tobacco products	0.000	0.000	0.000	0.000	0.000
13	Leather, rubber, and plastic products	0.435	0.277	0.043	0.042	1.190
14	Textile products	0.411	0.290	0.096	0.094	0.872
15	Hosiery, clothing and accessories	0.425	0.346	0.103	0.101	0.906
16	Lumber and wood products	0.501	0.316	0.047	0.046	1.230
17	Furniture, mattresses and lamps	0.454	0.380	0.067	0.065	1.133
18	Wood pulp, paper and paper products	0.569	0.290	0.034	0.033	1.494
19	Printing and publishing	0.655	0.345	0.057	0.055	1.175
20	Primary metal products	0.415	0.243	0.031	0.031	1.333
21	Fabricated metal products	0.544	0.392	0.053	0.055	1.291
22	Machinery	0.508	0.261	0.031	0.032	1.093
23	Motor vehicles, other transportation equipment and parts	0.508	0.360	0.053	0.052	1.159
24	Electrical, electronic and communication products	0.403	0.323	0.042	0.042	1.110
25	Non-metallic mineral products	0.608	0.301	0.041	0.043	1.330
26	Petroleum and coal products	0.661	0.135	0.014	0.013	1.398
27	Chemicals, pharmaceuticals and chemical products	0.597	0.206	0.026	0.026	1.815
28	Miscellaneous manufactured products	0.538	0.333	0.052	0.053	1.157
29	Residential building construction	0.593	0.442	0.061	0.060	1.417

Table 4

Commodity		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
30	Non-residential construction	0.693	0.516	0.065	0.062	1.641
31	Repair construction	0.684	0.521	0.070	0.069	1.442
32	Transportation and storage	0.795	0.469	0.069	0.069	1.473
33	Communications services	0.810	0.344	0.057	0.053	1.296
34	Other utilities	0.834	0.295	0.035	0.034	1.326
35	Wholesaling margins	0.813	0.540	0.080	0.078	1.546
36	Retailing margins and services	0.847	0.616	0.144	0.137	1.484
38	Finance, insurance, and real estate services	0.830	0.474	0.064	0.064	1.541
39	Professional, scientific, technical, computer, administrative, support, and related services	0.794	0.576	0.088	0.086	1.382
40	Education tuition and other fees	0.889	0.741	0.148	0.145	1.294
41	Health care and social assistance services	0.878	0.674	0.119	0.113	1.307
42	Accommodation services and meals	0.690	0.479	0.154	0.149	1.432
43	Miscellaneous services	0.766	0.528	0.122	0.119	1.414
47	Non-market services provided by non-profit institutions serving households	0.859	0.739	0.176	0.175	1.407
48	Non-market government sector services	0.846	0.674	0.102	0.097	1.478

Notes: Intensity ratios for GDP, Labour Income and Gross Output expressed as total impact per dollar of output change. Intensity ratios for employment expressed as total number of jobs required per $10,000 of output change. Please note that all employment impacts are measured in person-years.

Table 5: Alberta Industry Intensity Ratios

Closed Model - Direct, Indirect and Induced Impacts

Industry		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
11A	Crop and animal production	0.850	0.324	0.076	0.074	2.084
113	Forestry and logging	0.862	0.497	0.070	0.070	2.126
114	Fishing, hunting and trapping	1.101	1.034	0.239	0.233	2.183
115	Support activities for agriculture and forestry	0.935	0.623	0.118	0.116	1.988
211	Oil and gas extraction	0.965	0.197	0.022	0.021	1.392
212	Mining (except oil and gas extraction)	0.923	0.291	0.035	0.034	1.490
213	Support activities for mining and oil and gas extraction	1.013	0.712	0.088	0.087	1.772
22A	Electric power generation, transmission and distribution	0.901	0.285	0.030	0.029	1.427
22B	Natural gas distribution, water, sewage and other systems	1.007	0.334	0.044	0.042	1.655
230	Construction	0.864	0.610	0.084	0.081	1.921
311	Food manufacturing	0.682	0.360	0.075	0.075	2.300
312	Beverage and tobacco product manufacturing	0.698	0.327	0.051	0.051	1.682
31A	Textile and textile product mills	0.759	0.507	0.122	0.118	1.579
315	Clothing manufacturing	0.825	0.623	0.209	0.203	1.615
316	Leather and allied product manufacturing	0.836	0.417	0.194	0.199	1.676
321	Wood product manufacturing	0.837	0.513	0.074	0.073	1.976
322	Paper manufacturing	0.667	0.355	0.044	0.043	1.713
323	Printing and related support activities	0.791	0.475	0.079	0.075	1.570
324	Petroleum and coal products manufacturing	0.888	0.215	0.024	0.024	2.235
325	Chemical manufacturing	0.744	0.276	0.036	0.035	2.162
326	Plastics and rubber products manufacturing	0.717	0.453	0.072	0.070	1.831
327	Non-metallic mineral product manufacturing	0.869	0.440	0.062	0.065	1.848
331	Primary metal manufacturing	0.449	0.226	0.031	0.031	1.411
332	Fabricated metal products manufacturing	0.724	0.514	0.072	0.074	1.630
333	Machinery manufacturing	0.647	0.399	0.052	0.052	1.502
334	Computer and electronic product manufacturing	0.660	0.426	0.058	0.059	1.557
335	Electrical equipment, appliance and component manufacturing	0.650	0.532	0.071	0.073	1.592
336	Transportation equipment manufacturing	0.683	0.481	0.074	0.072	1.527
337	Furniture and related product manufacturing	0.773	0.574	0.107	0.104	1.757
339	Miscellaneous manufacturing	0.842	0.558	0.100	0.102	1.683
410	Wholesale trade	1.020	0.660	0.101	0.099	1.893
4A0	Retail trade	1.098	0.762	0.173	0.165	1.922

Table 5

Industry		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
484	Truck transportation	1.017	0.718	0.102	0.104	1.906
485	Transit and ground passenger transportation	1.239	0.830	0.176	0.169	2.064
486	Pipeline transportation	0.999	0.262	0.030	0.029	1.357
48A	Other transportation	0.888	0.515	0.076	0.074	1.912
49A	Postal service and couriers and messengers	1.072	0.768	0.161	0.158	1.992
493	Warehousing and storage	1.176	0.910	0.174	0.169	1.719
512	Motion picture and sound recording industries	0.762	0.369	0.126	0.123	1.759
513	Broadcasting and telecommunications	0.949	0.353	0.052	0.048	1.479
51A	Publishing industries, information services and data processing services	1.004	0.567	0.091	0.088	1.612
5A0	Finance, insurance, real estate and rental and leasing	1.166	0.648	0.061	0.061	1.725
541	Professional, scientific and technical services	1.063	0.772	0.118	0.114	1.885
561	Administrative and support services	1.082	0.817	0.222	0.217	1.965
562	Waste management and remediation services	1.148	0.820	0.139	0.139	1.793
610	Educational services	1.266	0.950	0.288	0.281	1.757
620	Health care and social assistance	1.109	0.760	0.130	0.123	1.729
710	Arts, entertainment and recreation	1.049	0.776	0.218	0.218	1.998
720	Accommodation and food services	0.928	0.619	0.182	0.175	1.845
811	Repair and maintenance	1.105	0.805	0.145	0.135	1.927
813	Grant-making, civic, and professional and similar organizations	1.120	0.868	0.176	0.166	1.948
81A	Personal and laundry services and private households	0.839	0.536	0.240	0.253	1.576
NP1	Non-profit institutions serving households (excluding education)	1.143	0.897	0.203	0.201	1.931
NP2	Non-profit education services	1.152	0.942	0.164	0.166	1.787
GS1	Hospitals and government nursing and residential care facilities	1.058	0.835	0.142	0.132	1.761
GS2	Universities and government education services	1.178	0.943	0.145	0.143	1.727
GS4	Other municipal government services	1.064	0.692	0.102	0.098	1.703
GS5	Other provincial and territorial government services	1.035	0.740	0.117	0.111	2.142
GS6	Other federal government services	1.043	0.801	0.110	0.106	1.834

Notes: Intensity ratios for GDP, Labour Income and Gross Output expressed as total impact per dollar of output change. Intensity ratios for employment expressed as total number of jobs required per $10,000 of output change. Please note that all employment impacts are measured in person-years.

Table 6: Alberta Industry Multipliers

Closed Model - Direct, Indirect and Induced Impacts

Industry		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
11A	Crop and animal production	2.315	3.426	2.159	2.167	2.084
113	Forestry and logging	1.978	1.991	2.269	2.220	2.126
114	Fishing, hunting and trapping	1.882	1.435	1.281	1.280	2.183
115	Support activities for agriculture and forestry	1.947	1.676	1.548	1.539	1.988
211	Oil and gas extraction	1.280	2.488	4.125	4.288	1.392
212	Mining (except oil and gas extraction)	1.354	1.815	2.367	2.412	1.490
213	Support activities for mining and oil and gas extraction	1.574	1.404	1.640	1.627	1.772
22A	Electric power generation, transmission and distribution	1.368	1.602	2.113	2.127	1.427
22B	Natural gas distribution, water, sewage and other systems	1.564	2.136	2.505	2.545	1.655
230	Construction	2.213	1.943	2.160	2.214	1.921
311	Food manufacturing	3.341	3.082	3.539	3.312	2.300
312	Beverage and tobacco product manufacturing	X	X	X	X	1.682
31A	Textile and textile product mills	1.611	1.482	1.306	1.307	1.579
315	Clothing manufacturing	X	X	X	X	1.615
316	Leather and allied product manufacturing	X	X	X	X	1.676
321	Wood product manufacturing	2.099	2.013	2.178	2.193	1.976
322	Paper manufacturing	1.939	2.054	2.703	2.784	1.713
323	Printing and related support activities	1.553	1.527	1.524	1.552	1.570
324	Petroleum and coal products manufacturing	13.516	7.893	13.425	13.387	2.235
325	Chemical manufacturing	4.087	3.844	4.795	4.813	2.162
326	Plastics and rubber products manufacturing	1.933	1.686	1.688	1.691	1.831
327	Non-metallic mineral product manufacturing	2.010	1.925	2.111	1.998	1.848
331	Primary metal manufacturing	X	X	X	X	1.411
332	Fabricated metal products manufacturing	1.759	1.576	1.738	1.689	1.630
333	Machinery manufacturing	1.619	1.575	1.826	1.784	1.502
334	Computer and electronic product manufacturing	1.729	1.675	1.931	1.889	1.557
335	Electrical equipment, appliance and component manufacturing	1.867	1.539	1.763	1.710	1.592
336	Transportation equipment manufacturing	X	X	X	X	1.527
337	Furniture and related product manufacturing	1.905	1.622	1.538	1.540	1.757
339	Miscellaneous manufacturing	1.680	1.562	1.514	1.486	1.683
410	Wholesale trade	1.797	1.666	1.816	1.819	1.893
4A0	Retail trade	1.749	1.554	1.375	1.386	1.922
484	Truck transportation	1.857	1.581	1.715	1.673	1.906
485	Transit and ground passenger transportation	X	X	X	X	2.064

Table 6

Industry		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
486	Pipeline transportation	1.247	1.745	2.352	2.357	1.357
48A	Other transportation	1.998	1.815	1.993	1.993	1.912
49A	Postal service and couriers and messengers	1.909	1.650	1.493	1.491	1.992
493	Warehousing and storage	X	X	X	X	1.719
512	Motion picture and sound recording industries	X	X	X	X	1.759
513	Broadcasting and telecommunications	X	X	X	X	1.479
51A	Publishing industries, information services and data processing services	X	X	X	X	1.612
5A0	Finance, insurance, real estate and rental and leasing	1.718	2.085	2.614	2.550	1.725
541	Professional, scientific and technical services	1.713	1.529	1.638	1.639	1.885
561	Administrative and support services	1.746	1.471	1.258	1.256	1.965
562	Waste management and remediation services	1.568	1.418	1.436	1.418	1.793
610	Educational services	1.502	1.329	1.168	1.168	1.757
620	Health care and social assistance	1.502	1.383	1.401	1.413	1.729
710	Arts, entertainment and recreation	1.779	1.547	1.311	1.302	1.998
720	Accommodation and food services	1.805	1.624	1.305	1.311	1.845
811	Repair and maintenance	1.744	1.512	1.496	1.527	1.927
813	Grant-making, civic, and professional and similar organizations	1.690	1.449	1.377	1.391	1.948
81A	Personal and laundry services and private households	1.121	0.939	1.141	1.183	1.576
NP1	Non-profit institutions serving households (excluding education)	1.718	1.419	1.299	1.292	1.931
NP2	Non-profit education services	1.511	1.295	1.300	1.284	1.787
GS1	Hospitals and government nursing and residential care facilities	1.541	1.364	1.392	1.418	1.761
GS2	Universities and government education services	1.489	1.315	1.393	1.386	1.727
GS4	Other municipal government services	1.532	1.450	1.569	1.584	1.703
GS5	Other provincial and territorial government services	2.804	2.592	3.151	3.216	2.142
GS6	Other federal government services	1.717	1.494	1.723	1.742	1.834

Notes: Multipliers for GDP expressed as total impact per direct change in GDP.
Multipliers for Labour Income expressed as total impact per direct change in Labour Income.
Multipliers for Gross Output expressed as total impact per direct change in Gross Output.
Multipliers for Employment expressed as total jobs required per direct job required.
Please note that all employment impacts are measured in person-years.

You must know the direct change in GDP at basic prices, labour income or number of direct jobs required before using these multipliers.

Table 7: Alberta Commodity Intensity Ratios in Producer Prices

Closed Model - Direct, Indirect and Induced Impacts

Commodity		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
1	Grains	0.876	0.248	0.046	0.045	1.748
2	Other agricultural products	0.852	0.379	0.089	0.087	2.189
3	Forestry products	0.865	0.494	0.069	0.070	2.117
4	Fish and seafood and hunting and trapping products	0.917	0.512	0.104	0.101	1.741
5	Metal ores and concentrates	0.937	0.356	0.054	0.052	1.766
6	Mineral fuels	0.967	0.198	0.022	0.022	1.396
7	Non-metallic minerals	0.955	0.249	0.031	0.030	1.491
8	Services incidental to mining	0.977	0.689	0.085	0.083	1.710
9	Meat, fish and dairy products	0.671	0.388	0.088	0.088	2.532
10	Fruit, vegetable and other food products and feeds	0.738	0.345	0.059	0.059	1.855
11	Soft drinks and alcoholic beverages	0.835	0.490	0.126	0.123	1.789
12	Tobacco and tobacco products	0.000	0.000	0.000	0.000	0.000
13	Leather, rubber, and plastic products	0.721	0.450	0.072	0.070	1.842
14	Textile products	0.753	0.511	0.157	0.153	1.546
15	Hosiery, clothing and accessories	0.772	0.594	0.168	0.164	1.592
16	Lumber and wood products	0.848	0.525	0.080	0.079	1.972
17	Furniture, mattresses and lamps	0.764	0.592	0.105	0.102	1.777
18	Wood pulp, paper and paper products	0.705	0.366	0.047	0.045	1.759
19	Printing and publishing	0.865	0.461	0.077	0.074	1.548
20	Primary metal products	0.540	0.314	0.044	0.044	1.552
21	Fabricated metal products	0.725	0.499	0.071	0.073	1.627
22	Machinery	0.717	0.374	0.048	0.049	1.499
23	Motor vehicles, other transportation equipment and parts	0.732	0.499	0.076	0.074	1.595
24	Electrical, electronic and communication products	0.612	0.462	0.063	0.064	1.562
25	Non-metallic mineral products	0.887	0.449	0.064	0.067	1.877
26	Petroleum and coal products	0.939	0.221	0.026	0.025	1.956
27	Chemicals, pharmaceuticals and chemical products	0.752	0.279	0.038	0.037	2.180
28	Miscellaneous manufactured products	0.812	0.495	0.079	0.080	1.688
29	Residential building construction	0.796	0.563	0.082	0.080	1.794

Table 7

Commodity		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
30	Non-residential construction	0.879	0.621	0.084	0.081	1.967
31	Repair construction	0.861	0.622	0.088	0.086	1.751
32	Transportation and storage	0.980	0.574	0.087	0.087	1.800
33	Communications services	0.985	0.438	0.074	0.069	1.599
34	Other utilities	0.973	0.369	0.048	0.046	1.566
35	Wholesaling margins	0.987	0.639	0.098	0.095	1.851
36	Retailing margins and services	1.081	0.750	0.168	0.160	1.894
38	Finance, insurance, and real estate services	1.007	0.575	0.082	0.081	1.852
39	Professional, scientific, technical, computer, administrative, support, and related services	1.033	0.718	0.113	0.110	1.801
40	Education tuition and other fees	1.157	0.895	0.176	0.172	1.762
41	Health care and social assistance services	1.118	0.810	0.143	0.136	1.728
42	Accommodation services and meals	0.916	0.612	0.181	0.175	1.840
43	Miscellaneous services	0.986	0.649	0.149	0.147	1.842
47	Non-market services provided by non-profit institutions serving households	1.149	0.903	0.205	0.204	1.916
48	Non-market government sector services	1.077	0.806	0.126	0.120	1.884

Notes: Intensity ratios for GDP, Labour Income and Gross Output expressed as total impact per dollar of output change. Intensity ratios for employment expressed as total number of jobs required per $10,000 of output change. Please note that all employment impacts are measured in person-years.

Table 8: Alberta Commodity Intensity Ratios in Purchaser Prices

Closed Model - Direct, Indirect and Induced Impacts

Commodity		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
1	Grains	0.876	0.248	0.046	0.045	1.748
2	Other agricultural products	0.813	0.362	0.085	0.083	2.089
3	Forestry products	0.857	0.490	0.069	0.069	2.098
4	Fish and seafood and hunting and trapping products	0.681	0.380	0.077	0.075	1.292
5	Metal ores and concentrates	0.937	0.356	0.054	0.052	1.766
6	Mineral fuels	0.821	0.168	0.019	0.018	1.185
7	Non-metallic minerals	0.789	0.205	0.025	0.024	1.232
8	Services incidental to mining	0.977	0.689	0.085	0.083	1.710
9	Meat, fish and dairy products	0.485	0.281	0.063	0.064	1.830
10	Fruit, vegetable and other food products and feeds	0.544	0.255	0.043	0.044	1.367
11	Soft drinks and alcoholic beverages	0.689	0.405	0.104	0.102	1.478
12	Tobacco and tobacco products	0.000	0.000	0.000	0.000	0.000
13	Leather, rubber, and plastic products	0.533	0.333	0.053	0.052	1.362
14	Textile products	0.507	0.344	0.106	0.103	1.041
15	Hosiery, clothing and accessories	0.521	0.400	0.113	0.111	1.074
16	Lumber and wood products	0.615	0.381	0.058	0.057	1.430
17	Furniture, mattresses and lamps	0.589	0.456	0.081	0.079	1.369
18	Wood pulp, paper and paper products	0.669	0.347	0.044	0.043	1.670
19	Printing and publishing	0.761	0.405	0.068	0.065	1.362
20	Primary metal products	0.540	0.314	0.044	0.044	1.552
21	Fabricated metal products	0.688	0.473	0.067	0.069	1.544
22	Machinery	0.598	0.312	0.040	0.041	1.251
23	Motor vehicles, other transportation equipment and parts	0.630	0.430	0.066	0.064	1.374
24	Electrical, electronic and communication products	0.504	0.380	0.052	0.052	1.286
25	Non-metallic mineral products	0.728	0.368	0.053	0.055	1.539
26	Petroleum and coal products	0.724	0.171	0.020	0.019	1.508
27	Chemicals, pharmaceuticals and chemical products	0.672	0.249	0.034	0.033	1.947
28	Miscellaneous manufactured products	0.659	0.402	0.064	0.065	1.370
29	Residential building construction	0.755	0.534	0.078	0.076	1.701

Table 8

Commodity		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
30	Non-residential construction	0.878	0.620	0.084	0.081	1.965
31	Repair construction	0.861	0.622	0.088	0.086	1.751
32	Transportation and storage	0.953	0.558	0.085	0.084	1.749
33	Communications services	0.944	0.420	0.070	0.067	1.532
34	Other utilities	0.948	0.359	0.046	0.045	1.525
35	Wholesaling margins	0.987	0.639	0.098	0.095	1.851
36	Retailing margins and services	1.075	0.745	0.167	0.159	1.883
38	Finance, insurance, and real estate services	0.995	0.568	0.081	0.080	1.830
39	Professional, scientific, technical, computer, administrative, support, and related services	0.983	0.683	0.108	0.105	1.715
40	Education tuition and other fees	1.146	0.886	0.174	0.170	1.745
41	Health care and social assistance services	1.118	0.810	0.143	0.136	1.728
42	Accommodation services and meals	0.874	0.584	0.173	0.167	1.755
43	Miscellaneous services	0.960	0.638	0.142	0.138	1.753
47	Non-market services provided by non-profit institutions serving households	1.149	0.903	0.205	0.204	1.916
48	Non-market government sector services	1.077	0.806	0.126	0.120	1.884

Notes: Intensity ratios for GDP, Labour Income and Gross Output expressed as total impact per dollar of output change. Intensity ratios for employment expressed as total number of jobs required per $10,000 of output change. Please note that all employment impacts are measured in person-years.

Table 9: Alberta Commodity Supply Ratios

Percent

Commodity		Alberta	Rest of Canada	Rest of World	Total Supply
1	Grains	73.8	24.3	1.9	100
2	Other agricultural products	77.0	18.3	4.7	100
3	Forestry products	66.8	29.4	3.8	100
4	Fish and seafood and hunting and trapping products	7.1	61.0	31.9	100
5	Metal ores and concentrates	2.1	0.0	97.9	100
6	Mineral fuels	84.4	9.1	6.5	100
7	Non-metallic minerals	60.4	21.9	17.7	100
8	Services incidental to mining	94.1	5.6	0.3	100
9	Meat, fish and dairy products	43.6	52.6	3.8	100
10	Fruit, vegetable and other food products and feeds	24.0	41.3	34.8	100
11	Soft drinks and alcoholic beverages	39.0	41.0	20.1	100
12	Tobacco and tobacco products	0.0	77.9	22.1	100
13	Leather, rubber, and plastic products	23.0	25.9	51.1	100
14	Textile products	9.6	22.2	68.1	100
15	Hosiery, clothing and accessories	3.1	4.4	92.5	100
16	Lumber and wood products	46.7	42.2	11.1	100
17	Furniture, mattresses and lamps	21.6	39.1	39.4	100
18	Wood pulp, paper and paper products	22.4	40.3	37.3	100
19	Printing and publishing	53.1	23.4	23.5	100
20	Primary metal products	22.9	25.5	51.6	100
21	Fabricated metal products	38.4	19.8	41.8	100
22	Machinery	25.3	7.9	66.8	100
23	Motor vehicles, other transportation equipment and parts	2.6	13.1	84.2	100
24	Electrical, electronic and communication products	3.6	10.6	85.8	100
25	Non-metallic mineral products	63.6	13.9	22.5	100
26	Petroleum and coal products	74.4	14.7	10.9	100
27	Chemicals, pharmaceuticals and chemical products	49.2	14.6	36.2	100
28	Miscellaneous manufactured products	18.4	16.1	65.6	100
29	Residential building construction	100.0	0.0	0.0	100
30	Non-residential construction	100.0	0.0	0.0	100

Table 9

Commodity		Alberta	Rest of Canada	Rest of World	Total Supply
31	Repair construction	100.0	0.0	0.0	100
32	Transportation and storage	77.3	20.0	2.7	100
33	Communications services	71.6	23.7	4.7	100
34	Other utilities	95.5	2.4	2.1	100
35	Wholesaling margins	73.6	25.9	0.4	100
36	Retailing margins and services	96.4	3.6	0.0	100
38	Finance, insurance, and real estate services	80.8	14.2	5.0	100
39	Professional, scientific, technical, computer, administrative, support, and related services	72.0	20.9	7.2	100
40	Education tuition and other fees	89.7	4.8	5.5	100
41	Health care and social assistance services	98.8	0.8	0.4	100
42	Accommodation services and meals	93.1	6.6	0.3	100
43	Miscellaneous services	86.8	9.3	4.0	100
44	Transportation margins	62.8	37.2	0.0	100

Table 10: Alberta Industry Intensity Ratios

Closed Model with Safety Net - Direct, Indirect and Induced Impacts

Industry		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
11A	Crop and animal production	0.788	0.289	0.069	0.067	1.976
113	Forestry and logging	0.783	0.453	0.062	0.062	1.988
114	Fishing, hunting and trapping	0.866	0.901	0.215	0.209	1.772
115	Support activities for agriculture and forestry	0.813	0.554	0.105	0.104	1.775
211	Oil and gas extraction	0.942	0.183	0.020	0.019	1.351
212	Mining (except oil and gas extraction)	0.884	0.269	0.031	0.030	1.421
213	Support activities for mining and oil and gas extraction	0.901	0.649	0.077	0.076	1.577
22A	Electric power generation, transmission and distribution	0.869	0.266	0.027	0.026	1.371
22B	Natural gas distribution, water, sewage and other systems	0.960	0.307	0.039	0.037	1.573
230	Construction	0.767	0.555	0.074	0.071	1.751
311	Food manufacturing	0.616	0.322	0.068	0.069	2.183
312	Beverage and tobacco product manufacturing	0.641	0.295	0.045	0.046	1.583
31A	Textile and textile product mills	0.663	0.453	0.112	0.109	1.411
315	Clothing manufacturing	0.733	0.570	0.200	0.194	1.453
316	Leather and allied product manufacturing	0.757	0.372	0.186	0.191	1.537
321	Wood product manufacturing	0.753	0.465	0.066	0.065	1.827
322	Paper manufacturing	0.618	0.327	0.039	0.038	1.627
323	Printing and related support activities	0.707	0.427	0.070	0.066	1.423
324	Petroleum and coal products manufacturing	0.862	0.200	0.022	0.021	2.190
325	Chemical manufacturing	0.705	0.254	0.033	0.032	2.095
326	Plastics and rubber products manufacturing	0.632	0.405	0.063	0.061	1.682
327	Non-metallic mineral product manufacturing	0.798	0.399	0.055	0.058	1.723
331	Primary metal manufacturing	0.413	0.206	0.027	0.027	1.348
332	Fabricated metal products manufacturing	0.643	0.468	0.064	0.066	1.488
333	Machinery manufacturing	0.588	0.365	0.046	0.046	1.399
334	Computer and electronic product manufacturing	0.598	0.390	0.052	0.053	1.448
335	Electrical equipment, appliance and component manufacturing	0.568	0.485	0.063	0.064	1.448
336	Transportation equipment manufacturing	0.593	0.430	0.065	0.063	1.371
337	Furniture and related product manufacturing	0.664	0.512	0.096	0.094	1.566
339	Miscellaneous manufacturing	0.735	0.497	0.089	0.091	1.495
410	Wholesale trade	0.909	0.597	0.090	0.088	1.699
4A0	Retail trade	0.974	0.692	0.161	0.153	1.706
484	Truck transportation	0.889	0.646	0.089	0.091	1.683

Table 10

Industry		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
485	Transit and ground passenger transportation	1.086	0.744	0.160	0.153	1.796
486	Pipeline transportation	0.967	0.243	0.026	0.026	1.300
48A	Other transportation	0.803	0.467	0.067	0.065	1.764
49A	Postal service and couriers and messengers	0.922	0.682	0.146	0.143	1.728
493	Warehousing and storage	1.012	0.816	0.157	0.153	1.430
512	Motion picture and sound recording industries	0.700	0.334	0.120	0.117	1.650
513	Broadcasting and telecommunications	0.889	0.319	0.046	0.042	1.374
51A	Publishing industries, information services and data processing services	0.909	0.513	0.081	0.078	1.444
5A0	Finance, insurance, real estate and rental and leasing	1.000	0.505	0.056	0.055	1.628
541	Professional, scientific and technical services	0.934	0.699	0.105	0.102	1.659
561	Administrative and support services	0.926	0.728	0.162	0.201	1.692
562	Waste management and remediation services	1.003	0.738	0.051	0.125	1.540
610	Educational services	1.100	0.856	0.271	0.264	1.466
620	Health care and social assistance	0.992	0.694	0.118	0.112	1.524
710	Arts, entertainment and recreation	0.913	0.699	0.205	0.204	1.759
720	Accommodation and food services	0.829	0.562	0.172	0.165	1.670
811	Repair and maintenance	0.945	0.715	0.129	0.119	1.647
813	Grant-making, civic, and professional and similar organizations	0.971	0.784	0.161	0.152	1.688
81A	Personal and laundry services and private households	1.010	0.722	0.237	0.239	1.516
NP1	Non-profit institutions serving households (excluding education)	0.999	0.815	0.188	0.186	1.678
NP2	Non-profit education services	0.992	0.851	0.148	0.150	1.507
GS1	Hospitals and government nursing and residential care facilities	0.915	0.754	0.127	0.118	1.510
GS2	Universities and government education services	1.023	0.855	0.130	0.127	1.456
GS4	Other municipal government services	0.946	0.625	0.090	0.086	1.496
GS5	Other provincial and territorial government services	0.916	0.673	0.104	0.099	1.933
GS6	Other federal government services	0.936	0.740	0.099	0.095	1.646

Notes: Intensity ratios for GDP, Labour Income and Gross Output expressed as total impact per dollar of output change. Intensity ratios for employment expressed as total number of jobs required per $10,000 of output change. Please note that all employment impacts are measured in person-years.

Table 11: Alberta Industry Multipliers

Closed Model with Safety Net - Direct, Indirect and Induced Impacts

Industry		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
11A	Crop and animal production	2.147	3.055	1.979	1.986	1.976
113	Forestry and logging	1.797	1.812	2.007	1.973	1.988
114	Fishing, hunting and trapping	1.481	1.250	1.153	1.152	1.772
115	Support activities for agriculture and forestry	1.693	1.490	1.385	1.379	1.775
211	Oil and gas extraction	1.249	2.321	3.685	3.827	1.351
212	Mining (except oil and gas extraction)	1.296	1.676	2.097	2.135	1.421
213	Support activities for mining and oil and gas extraction	1.401	1.280	1.429	1.421	1.577
22A	Electric power generation, transmission and distribution	1.319	1.499	1.882	1.894	1.371
22B	Natural gas distribution, water, sewage and other systems	1.492	1.966	2.232	2.265	1.573
230	Construction	1.964	1.768	1.906	1.951	1.751
311	Food manufacturing	3.015	2.759	3.217	3.022	2.183
312	Beverage and tobacco product manufacturing	X	X	X	X	1.583
31A	Textile and textile product mills	1.407	1.323	1.202	1.202	1.411
315	Clothing manufacturing	X	X	X	X	1.453
316	Leather and allied product manufacturing	X	X	X	X	1.537
321	Wood product manufacturing	1.887	1.825	1.926	1.941	1.827
322	Paper manufacturing	1.796	1.893	2.398	2.468	1.627
323	Printing and related support activities	1.387	1.374	1.359	1.378	1.423
324	Petroleum and coal products manufacturing	13.127	7.360	11.990	11.950	2.190
325	Chemical manufacturing	3.876	3.539	4.279	4.296	2.095
326	Plastics and rubber products manufacturing	1.704	1.507	1.484	1.487	1.682
327	Non-metallic mineral product manufacturing	1.844	1.746	1.863	1.778	1.723
331	Primary metal manufacturing	X	X	X	X	1.348
332	Fabricated metal products manufacturing	1.562	1.435	1.538	1.506	1.488
333	Machinery manufacturing	1.472	1.444	1.614	1.585	1.399
334	Computer and electronic product manufacturing	1.566	1.536	1.720	1.691	1.448
335	Electrical equipment, appliance and component manufacturing	1.631	1.404	1.555	1.518	1.448
336	Transportation equipment manufacturing	X	X	X	X	1.371
337	Furniture and related product manufacturing	1.637	1.448	1.379	1.381	1.566
339	Miscellaneous manufacturing	1.466	1.391	1.348	1.330	1.495
410	Wholesale trade	1.602	1.507	1.613	1.616	1.699
4A0	Retail trade	1.553	1.411	1.275	1.283	1.706
484	Truck transportation	1.625	1.422	1.497	1.470	1.683

Table 11

Industry		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
485	Transit and ground passenger transportation	X	X	X	X	1.796
486	Pipeline transportation	1.206	1.622	2.090	2.095	1.300
48A	Other transportation	1.808	1.646	1.766	1.766	1.764
49A	Postal service and couriers and messengers	1.641	1.466	1.350	1.350	1.728
493	Warehousing and storage	X	X	X	X	1.430
512	Motion picture and sound recording industries	X	X	X	X	1.650
513	Broadcasting and telecommunications	X	X	X	X	1.374
51A	Publishing industries, information services and data processing services	X	X	X	X	1.444
5A0	Finance, insurance, real estate and rental and leasing	1.473	1.627	2.375	2.321	1.628
541	Professional, scientific and technical services	1.505	1.384	1.455	1.456	1.659
561	Administrative and support services	1.494	1.311	1.168	1.166	1.692
562	Waste management and remediation services	1.371	1.276	1.284	1.273	1.540
610	Educational services	1.306	1.197	1.100	1.099	1.466
620	Health care and social assistance	1.344	1.263	1.272	1.280	1.524
710	Arts, entertainment and recreation	1.548	1.394	1.228	1.221	1.759
720	Accommodation and food services	1.611	1.476	1.232	1.237	1.670
811	Repair and maintenance	1.492	1.342	1.328	1.348	1.647
813	Grant-making, civic, and professional and similar organizations	1.466	1.308	1.259	1.268	1.688
81A	Personal and laundry services and private households	1.350	1.264	1.125	1.119	1.516
NP1	Non-profit institutions serving households (excluding education)	1.501	1.289	1.205	1.199	1.678
NP2	Non-profit education services	1.302	1.170	1.171	1.162	1.507
GS1	Hospitals and government nursing and residential care facilities	1.333	1.231	1.249	1.265	1.510
GS2	Universities and government education services	1.293	1.192	1.242	1.237	1.456
GS4	Other municipal government services	1.362	1.310	1.384	1.395	1.496
GS5	Other provincial and territorial government services	2.482	2.355	2.823	2.875	1.933
GS6	Other federal government services	1.541	1.381	1.552	1.567	1.646

Notes: Multipliers for GDP expressed as total impact per direct change in GDP.
Multipliers for Labour Income expressed as total impact per direct change in Labour Income.
Multipliers for Gross Output expressed as total impact per direct change in Gross Output.
Multipliers for Employment expressed as total jobs required per direct job required.
Please note that all employment impacts are measured in person-years.
The direct change in GDP at basic prices, labour income or number of direct jobs required must be known before using these multipliers.

Table 12: Alberta Commodity Intensity Ratios in Producer Prices

Closed Model with Safety Net - Direct, Indirect and Induced Impacts

Commodity		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
1	Grains	0.826	0.220	0.041	0.040	1.661
2	Other agricultural products	0.782	0.339	0.082	0.080	2.065
3	Forestry products	0.787	0.450	0.061	0.062	1.980
4	Fish and seafood and hunting and trapping products	0.822	0.458	0.094	0.092	1.574
5	Metal ores and concentrates	0.862	0.313	0.047	0.045	1.635
6	Mineral fuels	0.942	0.185	0.020	0.019	1.353
7	Non-metallic minerals	0.918	0.228	0.027	0.026	1.426
8	Services incidental to mining	0.887	0.637	0.075	0.075	1.552
9	Meat, fish and dairy products	0.595	0.345	0.080	0.080	2.399
10	Fruit, vegetable and other food products and feeds	0.674	0.309	0.052	0.053	1.741
11	Soft drinks and alcoholic beverages	0.754	0.444	0.117	0.115	1.648
12	Tobacco and tobacco products	0.000	0.000	0.000	0.000	0.000
13	Leather, rubber, and plastic products	0.642	0.406	0.064	0.062	1.704
14	Textile products	0.673	0.466	0.149	0.145	1.405
15	Hosiery, clothing and accessories	0.697	0.551	0.160	0.157	1.460
16	Lumber and wood products	0.760	0.474	0.071	0.070	1.816
17	Furniture, mattresses and lamps	0.654	0.530	0.093	0.091	1.583
18	Wood pulp, paper and paper products	0.651	0.335	0.041	0.040	1.663
19	Printing and publishing	0.796	0.421	0.070	0.067	1.427
20	Primary metal products	0.473	0.276	0.037	0.037	1.434
21	Fabricated metal products	0.643	0.452	0.063	0.065	1.483
22	Machinery	0.662	0.343	0.042	0.043	1.403
23	Motor vehicles, other transportation equipment and parts	0.643	0.448	0.067	0.065	1.439
24	Electrical, electronic and communication products	0.547	0.425	0.057	0.057	1.448
25	Non-metallic mineral products	0.807	0.404	0.056	0.059	1.737
26	Petroleum and coal products	0.900	0.199	0.022	0.021	1.888
27	Chemicals, pharmaceuticals and chemical products	0.710	0.255	0.034	0.033	2.106
28	Miscellaneous manufactured products	0.729	0.448	0.070	0.072	1.542
29	Residential building construction	0.704	0.510	0.073	0.071	1.632

Table 12

Commodity		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
30	Non-residential construction	0.780	0.565	0.074	0.071	1.795
31	Repair construction	0.777	0.574	0.080	0.078	1.604
32	Transportation and storage	0.887	0.522	0.078	0.078	1.637
33	Communications services	0.905	0.393	0.065	0.061	1.458
34	Other utilities	0.912	0.334	0.041	0.040	1.459
35	Wholesaling margins	0.891	0.584	0.088	0.086	1.682
36	Retailing margins and services	0.963	0.682	0.156	0.148	1.687
38	Finance, insurance, and real estate services	0.927	0.529	0.074	0.073	1.712
39	Professional, scientific, technical, computer, administrative, support, and related services	0.926	0.657	0.102	0.100	1.613
40	Education tuition and other fees	1.015	0.814	0.161	0.158	1.512
41	Health care and social assistance services	0.991	0.738	0.130	0.124	1.505
42	Accommodation services and meals	0.821	0.558	0.171	0.165	1.673
43	Miscellaneous services	0.907	0.614	0.139	0.136	1.665
47	Non-market services provided by non-profit institutions serving households	1.007	0.822	0.191	0.189	1.666
48	Non-market government sector services	0.946	0.731	0.112	0.107	1.654

Notes: Intensity ratios for GDP, Labour Income and Gross Output expressed as total impact per dollar of output change. Intensity ratios for employment expressed as total number of jobs required per $10,000 of output change. Please note that all employment impacts are measured in person-years.

Table 13: Alberta Commodity Intensity Ratios in Purchaser Prices

Closed Model with Safety Net - Direct, Indirect and Induced Impacts

Commodity		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
1	Grains	0.826	0.220	0.041	0.040	1.661
2	Other agricultural products	0.746	0.324	0.079	0.076	1.971
3	Forestry products	0.780	0.446	0.061	0.062	1.963
4	Fish and seafood and hunting and trapping products	0.610	0.340	0.070	0.068	1.168
5	Metal ores and concentrates	0.862	0.313	0.047	0.045	1.635
6	Mineral fuels	0.800	0.157	0.017	0.016	1.149
7	Non-metallic minerals	0.758	0.188	0.022	0.021	1.178
8	Services incidental to mining	0.887	0.637	0.075	0.075	1.552
9	Meat, fish and dairy products	0.430	0.249	0.058	0.058	1.734
10	Fruit, vegetable and other food products and feeds	0.497	0.228	0.038	0.039	1.284
11	Soft drinks and alcoholic beverages	0.623	0.367	0.097	0.095	1.361
12	Tobacco and tobacco products	0.000	0.000	0.000	0.000	0.000
13	Leather, rubber, and plastic products	0.475	0.300	0.047	0.046	1.260
14	Textile products	0.453	0.314	0.101	0.098	0.946
15	Hosiery, clothing and accessories	0.470	0.372	0.108	0.106	0.985
16	Lumber and wood products	0.551	0.344	0.052	0.051	1.317
17	Furniture, mattresses and lamps	0.504	0.408	0.072	0.070	1.220
18	Wood pulp, paper and paper products	0.618	0.318	0.039	0.038	1.579
19	Printing and publishing	0.701	0.371	0.062	0.059	1.256
20	Primary metal products	0.473	0.276	0.037	0.037	1.434
21	Fabricated metal products	0.610	0.429	0.059	0.062	1.407
22	Machinery	0.553	0.286	0.035	0.036	1.171
23	Motor vehicles, other transportation equipment and parts	0.553	0.366	0.058	0.056	1.239
24	Electrical, electronic and communication products	0.450	0.350	0.047	0.047	1.192
25	Non-metallic mineral products	0.662	0.331	0.046	0.048	1.424
26	Petroleum and coal products	0.694	0.154	0.017	0.016	1.455
27	Chemicals, pharmaceuticals and chemical products	0.634	0.227	0.030	0.029	1.881
28	Miscellaneous manufactured products	0.592	0.363	0.057	0.058	1.252
29	Residential building construction	0.667	0.484	0.069	0.067	1.547

Table 13

Commodity		GDP at Basic Prices	Labour Income	Employment 2008	Employment 2010	Gross Output
30	Non-residential construction	0.779	0.565	0.074	0.071	1.793
31	Repair construction	0.777	0.574	0.080	0.078	1.604
32	Transportation and storage	0.862	0.507	0.076	0.075	1.590
33	Communications services	0.867	0.376	0.063	0.059	1.397
34	Other utilities	0.889	0.326	0.040	0.039	1.422
35	Wholesaling margins	0.891	0.584	0.088	0.086	1.682
36	Retailing margins and services	0.957	0.678	0.155	0.148	1.676
38	Finance, insurance, and real estate services	0.916	0.523	0.073	0.072	1.692
39	Professional, scientific, technical, computer, administrative, support, and related services	0.881	0.625	0.097	0.095	1.536
40	Education tuition and other fees	1.005	0.806	0.160	0.156	1.497
41	Health care and social assistance services	0.991	0.738	0.130	0.124	1.505
42	Accommodation services and meals	0.784	0.532	0.163	0.158	1.596
43	Miscellaneous services	0.854	0.578	0.131	0.128	1.568
47	Non-market services provided by non-profit institutions serving households	1.007	0.822	0.191	0.189	1.666
48	Non-market government sector services	0.946	0.731	0.112	0.107	1.654

Notes: Intensity ratios for GDP, Labour Income and Gross Output expressed as total impact per dollar of output change. Intensity ratios for employment expressed as total number of jobs required per $10,000 of output change. Please note that all employment impacts are measured in person-years.

Appendix 1:

Industry Aggregation Parameters

Industry		Worksheet Level Number	Link Level Number
11A	Crop & Animal Production	111400-112A00	111, 112
113	Forestry & Logging	113000	113
114	Fishing, Hunting & Trapping	114000	114
115	Support Activities for Agriculture & Forestry	115100-115300	115
211	Oil & Gas Extraction	211100	2111
212	Mining (Except Oil & Gas Extraction)	212100-21239A	2121, 2122, 2123
213	Supporting Activities for Mining & Oil & Gas Extraction	213100	2131
22A	Electric Power Generation, Transmission & Dist'n	221100	2211
22B	Natural Gas Dist'n, Water, Sewage & other Systems	221200-221300	2212, 2213
230	Construction	2300A0-230010	23
311	Food Manufacturing	311100-3119A0	311
312	Beverage & Tobacco Production Manufacturing	312110-312200	312
31A	Textile, 315 Clothing & 316 Leather Industries	313100-316900	313, 314, 315, 316
321	Wood Product Manufacturing	321100-3219900	321
322	Paper manufacturing	322110-322290	322
323	Printing & related Support Activities	323110-323120	323
324	Petroleum & Coal Products Manufacturing	324100-324190	324
325	Chemical Manufacturing	325110-325900	325
326	Plastics & Rubber Products Manufacturing	362110-32690	326
327	Non-Metallic Mineral Products Manufacturing	327310-327900	327
331	Primary Metal Manufacturing	331100-331520	331
332	Fabricated Metal Products Manufacturing	332100-332900	332
333	Machinery Manufacturing & 336 Transportation Equip.	33110-333990, 336110-336900	333, 336
334	Computer & Electronic Products Manufacturing	334100-334600	334
335	Electrical Equip., Appliance & Component Manufacturing	335200-3359S0	335
337	Furniture & Related Products Manufacturing	337110-337900	337
339	Miscellaneous Manufacturing	339100-339990410000	339
410	Wholesale Trade	4A0000	41
4A0	Retail Trade	484000	44-45
484	Truck Transportation	484000	484
485	Transit & Ground Passenger Transportation	485100-485A00	485
486	Pipeline Transportation	486200-486A00	486
48A	Air, Rail, Water & Scenic & Sightseeing Transportation	481000-483000, 487000-488000	481-483, 487, 488

Appendix 1:

Industry		Worksheet Level Number	Link Level Number
49A	Postal Service and Couriers & Messengers	491000-492000	491, 492
493	Warehousing & Storage	493130-4931A0	493
512	Motion Picture & Sound Recording Industries	512130-5122200	512
513	Broadcasting & Telecommunications	513100-513300	513
51A	Publishing Industries, Information Services & Data Processing	511100-511200, 514100-514200	511, 514
5A0	Finance, Insurance, Real Estate and Renting & leasing	511100-511200, 514100-514200	521-523, 526, 531-533, 551
541	Professional, Scientific & Technical Services	5A0110-5A0650	541
561	Administrative & Support Service	541300-541B00	561
652	Waste Management & Remediation Services	561500-561A00	562
610	Educational Services	562000	611
620	Health Care & Social Assistance	611100-611B00621110-624000	621, 623, 624
710	Arts, Entertainment & Recreation	711000-713A00	71
720	Accommodation & Food Services	721100-722000	72
811	Repair & Maintenance	811110-811A00	811
813	Grant Making, Civic & Professional & Similar Orgs.	813A00	8132-8134, 8139
81A	Personal & Laundry Services & Private Households	812200-814000	812, 814
NP1	Non-Profit Institutions Serving Households (Excl. Education)	NP1100-NP1900	Fictive
NP2	Non-Profit Education Institutions	NP2000	Fictive
GS1	Hospitals & Residential Care Facilities	GS1100-GS1200	622
GS2	Education	GS2100-GS2230	6113
GS4	Other Municipal Government Services	GS4000	Fictive
GS5	Other Provincial Government Services	GS5000	Fictive
GS6	Other Federal Government Services	GS3000, GS6000	Fictive

Appendix 2:

Industry Codes at the Worksheet Level (W) in terms of 1997 NAICS

Code	Industry Title - W	1997 NAICS
111400	Greenhouse, Nursery and Floriculture Production	1114
111A00	Crop Production (except Greenhouse, Nursery and Floriculture Production)	1111-1113, 1119
112500	Animal Aquaculture	1125
112A00	Animal Production (except Animal Aquaculture)	1121-1124, 1129
11300	Forestry and Logging	113
114000	Fishing, Hunting and Trapping	114
115100	Support Activities for Crop Production	1151
115200	Support Activities for Animal Production	1152
115300	Support Activities for Forestry	1153
211100	Oil and Gas extraction	2111
212100	Coal Mining	21221
212210	Iron Ore Mining	21222
212230	Copper, Nickel, Lead and Zinc Ore Mining	21223
212290	Other Metal Ore Mining	21229
212310	Stone Mining and Quarrying	21231
212320	Sand, Gravel, Clay & Ceramic & Refractory Minerals Mining & Quarrying	21232
212393	Salt Mining	212392
212394	Asbestos Mining	212393
212396	Potash Mining	212394
21239A	Miscellaneous Non-Mineral Mining and Quarrying	212396
213100	Support Activities for Mining and Oil and Gas Extraction	2131
221100	Electric Power Generation, Transmission and Distribution	2211
221200	Natural Gas Distribution	2212
221300	Water, Sewage and Other Systems	2213
2300A0	Residential Building Construction	231210
2300B0	Non-residential building Construction	231220
2300C0	Transportation Engineering Construction	231310
2300D0	Oil and Gas Engineering Construction	231330
2300E0	Electric Power Engineering Construction	23
2300F0	Communication Engineering Construction	23
2300G0	Other Engineering Construction	23
2300H0	Repair Construction	23
2300I0	Other activities of the Construction Industry	23
311100	Animal Food Manufacturing	3111
311210	Flour Milling and Malt Manufacturing	31121
311220	Starch and Vegetable Fat and Oil Manufacturing	31122
311230	Breakfast Cereal Manufacturing	31123
311310	Sugar Manufacturing	31131
3113A0	Confectionery Product Manufacturing	31131
311410	Frozen Food Manufacturing	31141
311420	Fruit and Vegetable Canning, Pickling and Drying	31142
311500	Dairy Product Manufacturing	3115

Appendix 2:

Code	Industry Title - W	1997 NAICS
311611	Animal (except Poultry) Slaughtering	311611
311614	Rendering and Meat Processing from Carcasses	311614
311615	Poultry Processing	311615
311700	Seafood Product Preparation and Packaging	3117
311810	Bread and Bakery Production Manufacturing	31181
311821	Cookie and Cracker Manufacturing	311821
311822	Flour Mixes and Dough Manufacturing from Purchased Flour	311822
31182A	Dry Pasta and Tortilla Manufacturing	311823, 31183
311910	Snack Food Manufacturing	31191
311920	Coffee and Tea Manufacturing	31192
3119A0	Other Miscellaneous Food Manufacturing	31193, 31194, 31199
312110	Soft Drink and Ice Manufacturing	31211
312120	Breweries	31213
312130	Wineries	31214
212140	Distilleries	31214
212200	Tobacco Manufacturing	3122
313100	Fiber, Yarn and Thread Mills	3131
313200	Fabric Mills	3132
313300	Textile and Fabric Finishing and Fabric Coating	3133
314110	Carpet and Rug Mills	31411
314120	Curtain and Linen Mills	31412
314910	Textile Bag and Canvas Mills	31491
314990	All Other Textile Product Mills	31499
315110	Hosiery and Stock Mills	31511
315190	Other Clothing Knitting Mills	31519
315210	Cut and Sew Clothing Contracting	31521
315220	Men's and Boys' Cut and Sew Clothing Manufacturing	31522
315230	Women's and Girls' Cut and Sew Clothing Manufacturing	31523
315290	Other Cut and Sew Clothing Manufacturing	31529
315900	Clothing Accessories and Other Clothing Manufacturing	3159
316100	Leather and Hide Tanning and Fishing	3161
316200	Footwear Manufacturing	3162
136900	Other Leather and Allied Product Manufacturing	3169
321100	Sawmills and Wood Preservation	3211
321215	Structural Wood Production Manufacturing	321215
32121A	Veneer and Plywood Mills	321211, 321212
32121B	Particle Board, Fiberboard and Waferboard Mills	321216, 321217
321911	Wood Window and Floor Manufacturing	321911
321919	Other Millwork	321919
321920	Wood container and Pallet Manufacturing	32192
321990	All Other Wood Product Manufacturing	32199

Appendix 2:

Code	Industry Title - W	1997 NAICS
322110	Pulp Mills	32211
322121	Paper (except Newsprint) Mills	322121
322122	Newsprint Mills	322122
322130	Paperboard Mills	32213
322210	Paperboard Container Manufacturing	32221
322220	Paper Bag and Coated and Treated Paper Manufacturing	32222
322230	Stationery Product Manufacturing	32223
322290	Other Converted Paper Product Manufacturing	32229
323110	Printing	32311
323120	Support Activities for Printing	32312
324110	Petroleum Refineries	32411
324120	Asphalt Paving, Roofing and Saturated Materials Manufacturing	32412
324190	Other Petroleum and Coal Products Manufacturing	32419
325110	Petrochemical Manufacturing	32511
325120	Industrial Gas Manufacturing	32512
325130	Synthetic Dye and Pigment Manufacturing	32513
3251A0	Other Basic Chemical Manufacturing	32518, 32519
325200	Resin, Synthetic Rubber & Artificial & Synthetic Fibers & Filaments Manufacturing	3252
325310	Fertilizer Manufacturing	32531
325320	Pesticide and Other Agricultural Chemical Manufacturing	32532
325400	Pharmaceutical and Medicine Manufacturing	3254
325510	Paint and Coating Manufacturing	32551
3119A0	Other Miscellaneous Food Manufacturing	31193, 31194, 3199
312110	Soft Drink and Ice Manufacturing	31211
312120	Breweries	31212
312130	Wineries	31213
312140	Distilleries	31214
312200	Tobacco Manufacturing	3122
313100	Fiber, Yarn and Thread Mills	3131
313200	Fabric Mills	3132
313300	Textile and Fabric Finishing and Fabric Coating	3133
314100	Carpet and Rug Mills	31411
314120	Curtain and Linen Mills	31412
314910	Textile Bag and Canvas Mills	31491
314990	All Other Textile Product Mills	31499
315110	Hosiery and Sock Mills	31511
315190	Other Clothing Knitting Mills	31519
315210	Cut and Sew Clothing Contracting	31521
315220	Men's and Boy' Cut and Sew Clothing Manufacturing	31522
315230	Women's and girls' Cut and Sew Clothing Manufacturing	31523
315290	Other Cut and Sew Clothing manufacturing	31529

Appendix 2:

Code	Industry Title - W	1997 NAICS
315900	Clothing Accessories and Other Clothing Manufacturing	3159
316100	Leather and Hide Tanning and Finishing	3161
316200	Footwear Manufacturing	3162
316900	Other Leather and Allied Product Manufacturing	3169
321100	Sawmills and Wood Preservation	3211
321215	Structural Wood Product Manufacturing	321215
32121A	Veneer and Plywood Mills	321211, 321212
32121B	Particle Board, Fiberboard and Waferboard Mills	321216, 321217
321911	Wood Window and Door Manufacturing	321911
321919	Other Millwork	321919
321920	Wood Container and Pallet Manufacturing	32192
321990	All Other Wood Product Manufacturing	32199
322110	Pulp Mills	32211
322121	Paper (except Newsprint) Mills	322121
322122	Newsprint Mills	322122
322130	Paperboard Mills	33213
322210	Paperboard Container Manufacturing	32221
322220	Paper Bag and Coated and Treated Paper Manufacturing	32222
322230	Stationery Product Manufacturing	32223
322290	Other Converted Paper Product Manufacturing	32229
323110	Printing	32311
323120	Support Activities for Printing	32312
324110	Petroleum Refineries	32411
324120	Asphalt Paving, Roofing and Saturated Materials Manufacturing	32412
324190	Other Petroleum and Coal Products Manufacturing	32419
325110	Petrochemical Manufacturing	32511
325120	Industrial Gas Manufacturing	32512
325130	Synthetic Dye and Pigment Manufacturing	32513
3251A0	Other Basic Chemical Manufacturing	32518, 32519
325200	Resin, Synthetic Rubber and Artificial & Synthetic Fibers & Filaments Manufacturing	3252
325310	Fertilizer Manufacturing	32531
325320	Pesticide and Other Agricultural Chemical Manufacturing	32532
325400	Pharmaceutical and Medicine Manufacturing	3254
334400	Semiconductor and Other Electronic Component Manufacturing	3344
334500	Navigational, Measuring, Medical and Control Instruments Manufacturing	3345
334600	Manufacturing and Reproduction Magnetic and Optical Media	3346
335100	Electric Lighting Equipment Manufacturing	3351
335200	Household Appliance Manufacturing	3352
335311	Power, Distribution and Specialty Transformers Manufacturing	335311
335312	Motor and Generator Manufacturing	335312
335315	Switchgear and Switchboard & Relay and Industrial Control Apparatus	335315
335910	Battery Manufacturing	33591

Appendix 2:

Code	Industry Title - W	1997 NAICS
335920	Communication and Energy Wire and Cable Manufacturing	33592
3359A0	Wiring Devices and All Other Electrical Equipment and Component Manufacturing	33593, 33599
336110	Automobile and Light-Duty Motor Vehicle Manufacturing	33611
336120	Heavy-Duty Truck Manufacturing	33612
336200	Motor Vehicle Body and Trailer Manufacturing	3362
336310	Motor Vehicle Gasoline Engine and Engine Parts Manufacturing	33631
336320	Motor Vehicle Electrical and Electronic Equipment Manufacturing	33632
336330	Motor Vehicle Steering and Suspension Components (except Spring) Manufacturing	33633
336340	Motor Vehicle Brake System Manufacturing	33634
336350	Motor Vehicle Transmission and Power Train Parts Manufacturing	33635
336360	Motor Vehicle Seating and Interior Trim Manufacturing	33636
336370	Motor Vehicle Metal Stamping	33637
336390	Other Motor Vehicle Parts Manufacturing	33639
336400	Aerospace Product and Parts Manufacturing	3364
336500	Railroad Rolling Stock Manufacturing	3365
336611	Ship Building and Repairing	336611
336612	Boat Building	336612
336900	Other Transportation Equipment Manufacturing	3369
337110	Wood Kitchen Cabinet and Counter Top Manufacturing	33711
337127	Institutional Furniture Manufacturing	337127
33712A	Household furniture Manufacturing	337121, 337123, 337126
337200	Office Furniture (including Fixtures) Manufacturing	3372
337900	Other Furniture-Related Product Manufacturing	3379
339100	Medical Equipment and Supplies Manufacturing	3391
339910	Jeweler and Silverware Manufacturing	33991
339920	Sporting and Athletic Goods Manufacturing	33992
339930	Doll, Toy and Game Manufacturing	33993
339940	Office Supplies (except Paper) Manufacturing	33994
339950	Sign Manufacturing	33995
339990	All Other Miscellaneous Manufacturing	33999
41000	Wholesale Trade	41
4A000	Retail Trade	44-45
481000	Air Transportation	481
482000	Rail Transportation	482
483000	Water Transportation	483
484000	Truck Transportation	484
485100	Urban Transit Systems	4851
485200	Interurban and Rural Bus Transportation	4852
485300	Taxi and Limousine Service	4853
485A00	All Other Transit and Ground Passenger Transportation	4854, 4855, 4859
486200	Pipeline Transportation of Natural Gas	4862

Appendix 2:

Code	Industry Title - W	1997 NAICS
486A00	Crude Oil and Other Pipeline Transportation	4861, 4869
4931A0	All Other Warehousing and Storage	49311, 49312, 49319
511100	Newspaper, Periodical, Book and Database Publishers	5111
511200	Software Publisher	5112
512130	Motion Picture and Video Exhibition	51213
5121A0	Motion Picture & Vide Production, Distribution , Post-reduction & Other Motion Picture & video Ind.	51211, 51212, 51219
512200	Sound recording Industries	5122
513100	Radio and Television Broadcasting	5131
513200	Pay TV, Specialty TV and Program Distribution	5132
513300	Telecommunications	5133
514100	Information Services	5141
514200	Data Processing Services	5142
5A0110	Monetary Authorities - Central Bank	521
5A0120	Local Credit Unions	52213
5A0130	Banking and Other Depository Credit Intermediation	52211, 52219
5A0200	Insurance Carriers	5241
5A0300	Lessors of Real Estate	5311
5A0400	Owner-Occupied Dwellings	5311
5A0510	Automotive Equipment Rental and Leasing	5321
5A0520	Rental and leasing (except Automotive Equipment) and Lessors of Non-Financial Intangible Assets (except Copyrighted Works)	5322-5324, 533
5A0610	Non-Depository Credit Intermediation and Activities Related to Credit Intermediation	5222, 5223
5A0620	Agencies, Brokerages and Other Insurance Related Activities	5242
5A0630	Securities, Commodity Contracts, Funds and Other Financial Investment	523, 526
5A0640	Offices of Real Estate Agents and Brokers and Activities Related to Real Estate	5312, 5313
5A0650	Management of Companies and Enterprises	551
541300	Architectural, Engineering and Related Services	5413
541500	Computer Systems Design and Related Services	5415
541800	Advertising and Related Services	5418
541A00	Legal, Accounting, Tax reparation, Bookkeeping and Payroll Services	5411, 5412
541B00	Other Professional, Scientific and Technical Services	5414, 5416, 5417, 5419
561500	Travel Arrangement and Reservation Services	5615
161600	Investigation and Security Services	5616
161700	Services to Buildings and Dwellings	5617
161A00	Other Administrative and Support Services	5611-5614, 5619
562000	Waste Management and Remediation Services	562
611A00	Education and Educational Support Services (excluding non-profit and government)	61
621100	Offices of Physicians	6211
621200	Offices of Dentists	6212
621A00	Miscellaneous Ambulatory Health Care Services	6213-6216, 6219

Appendix 2:

Code	Industry Title - W	1997 NAICS
623000	Nursing and Residential Care Facilities	623
624000	Social Assistance	624
711000	Performing Arts, Spectator Sports and Related Industries	711
712000	Heritage Institutions (excluding Government Funded)	712
713200	Gambling Industries	7132
713A00	Amusement and Recreation Industries	7131, 7139
721100	Traveler Accommodation	7211
721A00	RV (Recreational Vehicle) Parks, Recreational Camps, and Rooming & Boarding	7212, 7213
722000	Food Services and Drinking Places	722
811100	Automotive Repair and Maintenance	8111
811A00	Repair and Maintenance (except Automotive Repair and Maintenance)	8112-8114
812200	Funeral Services	8122
814000	Private Households	814
F10100	Operating Supplies	Fictive
F10200	Office Supplies	Fictive
F10300	Cafeteria Supplies	Fictive
F10400	Laboratory Supplies	Fictive
F20100	Travel & Entertainment	Fictive
F20200	Advertising and Promotion	Fictive
F30000	Transportation Margins	Fictive
NP1100	Religious Organizations	8131
NP1200	Non-Profit Welfare Organizations	Fictive
NP1300	Non-Profit Sports and Recreation Clubs	Fictive
NP2000	Non-Profit Education Services	Fictive
NP1900	Other Non-Profit Institutions Serving Households	Fictive
GS1100	Hospitals	622
GS1200	Government Residential Care Facilities	Fictive
GS2100	Universities	6113
GS2210	Government Elementary and Secondary Schools	6111
GS2220	Government Community Colleges and C.E.G.E.P.'s	6112
GS2230	Other Government Education Services	Fictive
GS3000	Defense Services	9111
GS4000	Other Municipal Government Services	Fictive
GS5000	Other Provincial and Territorial Government Services'	Fictive
GS6000	Other Federal Government Services	Fictive
GS7000	Other Aboriginal Government Services	Fictive
GS4000	Other Municipal Government Services	Fictive
GS5000	Other Provincial and Territorial Government Services'	Fictive
GS6000	Other Federal Government Services	Fictive
GS7000	Other Aboriginal Government Services	Fictive